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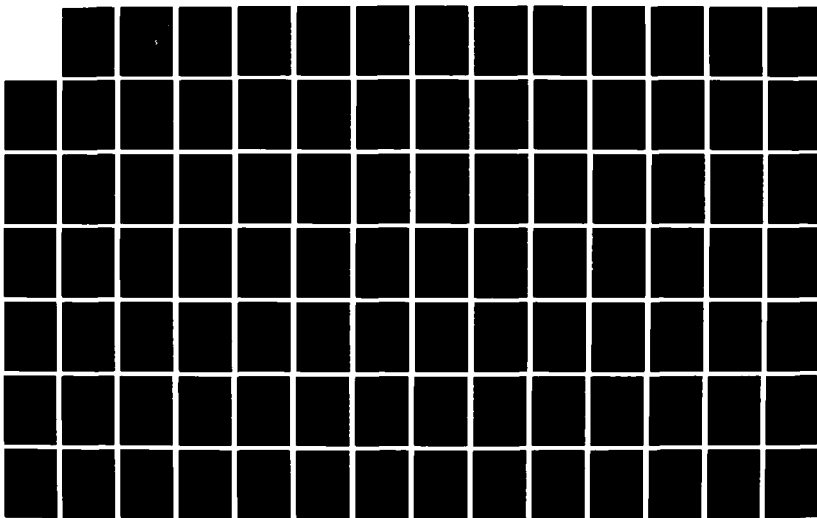
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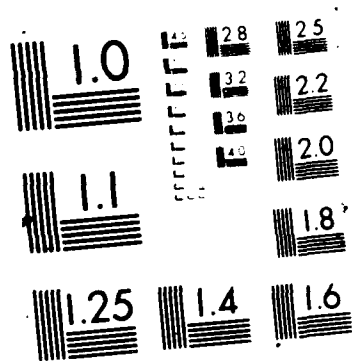
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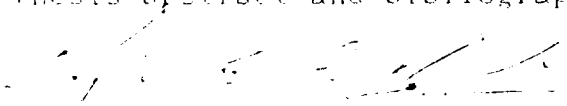
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THESIS ABSTRACT

This thesis analyzes the legality of nuclear weapons employment under international humanitarian law. Factual background data is given on present strategic and tactical nuclear arsenals; nuclear war strategies; targeting categories; and principle effects of nuclear weapons, including types of nuclear explosions and combined effects of multiple nuclear detonations, including the potential for environmental disaster.

The legal framework is then set forth: the sources of humanitarian law (law of war); basic principles of humanitarian law (military necessity, humanity, proportionality, unnecessary suffering, and indiscriminate weapons); sanctions for violations of humanitarian norms; the impact of modern warfare; and a summary of views on the application of humanitarian norms to nuclear weapons.

A tripartite analysis of the legality of nuclear weapons use is then made using express international treaty limitations, implied treaty limitations, and limitations from customary humanitarian norms. Pro and con arguments are examined in each area.

The thesis concludes that express treaty limitations on nuclear weapons do not inhibit probable military uses; implied treaty limitations are questionable; but customary norms legally apply to nuclear weapons and limit lawful uses, except in the case of reprisals. Specific contextual situations for nuclear weapons use are then examined. Further conclusions are: nuclear weapons could be lawfully used against non-urban military

targets, both strategic and tactical, and against urban targets in reprisal for prior nuclear attacks on cities, but even lawful uses could lead to disproportionate, and therefore illegal, results, especially given the probability of escalatory responses and the problem of unintended, but widespread environmental impacts.

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THE LEGALITY OF NUCLEAR WEAPONS EMPLOYMENT UNDER THE
INTERNATIONAL HUMANITARIAN LAW OF COERCION CONTROL

By

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B.A. June 1972, University of Virginia

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INTRODUCTION

This thesis will examine the legality of employing nuclear weapons in international conflicts under the international humanitarian laws of coercion control. The importance of the subject should be self-evident: nuclear weapons threaten the very existence of the human race and the planet Earth.

No less an authority than Andrei Sakharov, the noted Soviet physicist who was the "father" of the Soviet hydrogen bomb and winner of the 1975 Nobel Peace prize, has concluded that all-out nuclear war "would mean the destruction of contemporary civilization, hurl man back centuries, cause the death of hundreds of millions or billions of people, and, with a certain degree of probability, would cause man to be destroyed as a biological species and could even cause the annihilation of life on earth." 1

In order to properly analyze the legality of employing nuclear weapons under international humanitarian law, it will be necessary to first establish the factual framework within which the legal analysis is to be made. Legal rules do not exist in a vacuum. They exist and are applied only in discrete factual settings. This thesis will, therefore, first examine present nuclear armaments levels, the nuclear war-fighting strategies of the United States and

1. Sakharov, The Danger of Thermonuclear War, 61 Foreign Aff. 1001, 1006 (1983).

the Soviet Union, and the potential effects of nuclear weapons employments.

After establishing the requisite factual framework, the legal framework for the analysis will be set forth. This will consist of a brief examination of the nature, sources, and content of the international humanitarian law of coercion control as it exists within the broader context of international law as a whole.

These factual and legal frameworks will then be applied in examining both customary and conventional international humanitarian coercion control norms to assess what legal constraints, if any, limit the use of nuclear weapons. In addition to establishing the existence or nonexistence of legal limitations on nuclear weapons, the probable effectuality of any purported legal limitations will be carefully analyzed from a real-world perspective. This is a prerequisite step in any logical inquiry which hopes to reach sound recommendations for future international legal initiatives that might be taken to reduce the nuclear threat facing humanity, as this thesis will attempt to do.

The ability of international humanitarian norms to prevent or limit the use of nuclear weapons in the midst of an actual conflict may well determine the future survival of mankind. For this reason, a thorough exploration of the legality of nuclear weapons employment under the international humanitarian law is vitally important.

SECTION I

FACTUAL FRAMEWORK FOR ANALYSIS

A. Present Nuclear Arsenals

The nuclear arsenals of the United States and the Soviet Union now number approximately 50,000 nuclear weapons of all types, with Britain, France, and the People's Republic of China possessing some 1400 more. 2 Throughout this thesis the term "nuclear" will be used to refer to both atomic (fission) and thermonuclear (fusion) weapons. Existing nuclear weapons contain a total estimated explosive force equivalent to between 15,000 to 20,000 megatons (one million tons) of TNT. 3

As staggering as these aggregate numbers are standing alone, one scholar describes the current nuclear inventory in terms most individuals can more easily understand as being equivalent to some 1,600,000 Hiroshimas. 4 Another source states that this force level is equal to approximately 18 billion tons of TNT, or more than 6,000 times the explosive power of all the munitions detonated in the Second

2. E.g., Int'l Inst. for Strategic Studies, The Military Balance 1986-1987, at 200-11, 222 (1986) [hereinafter IISS]; J. Turner & Stockholm Int'l Peace Research Inst., Arms in the '80s, at 89-91, 94 (1985) [hereinafter Turner]; O. Greene, I. Percival, and I. Ridge, Nuclear Winter 10 (1985) [hereinafter Greene].

3. E.g., J. Schell, The Fate of The Earth 3 (1982); H. Willens, The Trimtab Factor 45 (1984); Sagan, Nuclear War and Climatic Catastrophe, 62 Foreign Aff. 252, 260 (1983).

4. J. Schell, supra note 3, at 3.

World War (which equalled only three megatons, including the atomic bombings at Hiroshima and Nagasaki). 5

The explosive force carried on just one U.S. Poseidon ballistic missile submarine is estimated to equal three World War II's, or enough to destroy some 200 Soviet cities, while a newer U.S. Trident submarine with 24 missiles carries nuclear firepower equal to eight times that of World War II, or "enough to destroy every major city in the northern hemisphere." 6

The current world total of nuclear firepower equates roughly to between three to four tons of explosive force for every man, woman, and child on earth. One analyst has further graphically illustrated the present armaments levels by stating that "[i]f an explosion equivalent to one Hiroshima bomb went off every hour, twenty-four hours a day, seven days a week, it would take almost 115 years to detonate all of the nuclear explosives presently stockpiled by the two superpowers." 7

Since 1945, the nuclear weapons industry in the United States has produced some 60,000 nuclear warheads. 8 It produces nuclear weapons at a current rate of five per day,

5. H. Willens, supra note 3, at frontispiece ("Nuclear Weapons Chart"). See appendix A.

6. Id.

7. Bates, The Medical and Ecological Effects of Nuclear War, 28 McGill L.J. 719 (1983).

8. Wash. Post, Apr. 23, 1987, at A10, col. 1.

at an annual cost of over seven billion dollars. Due to the retirement of older warheads, however, the overall U.S. nuclear inventory has not grown in the last half decade. 9 Given that the Soviet nuclear weapons inventory is of similar size, its nuclear warhead production is presumably equivalent to that of the United States.

1. Strategic Nuclear Weapons

Examining the nuclear arsenals in more detail, nuclear weapons can be analytically divided into two general categories: strategic and theater/tactical. Strategic nuclear weapons are those carried on delivery systems which have intercontinental range. This is generally defined as ranges greater than 5,500 kilometers. 10

a. The United States

A recent unclassified source estimates that the United States has some 12,846 strategic weapons. 11 These are carried on intercontinental bomber aircraft, land-based intercontinental ballistic missiles, and intercontinental ballistic missile-launching submarines. 12

9. Id.

10. E.g., IISS, supra note 2, at 207.

11. Id. at 222. See appendix B. See also, Turner, supra note 2, at 89 (giving a somewhat higher estimate of 13,748 as of 1985).

12. Id. at 200-01. See also, P. Rodger, A Guide to Nuclear Weapons (1984)(for a detailed description of each type of nuclear weapon system and its characteristics).

U.S. strategic missiles vary considerably in the number of warheads they carry and the size of those warheads. For example, on land-based missiles, "Minuteman II" carries one warhead of 1-2 megatons; "Minuteman III" carries three warheads of 170 or 335 kilotons each; and the new "Peace-keeper" hosts ten 335 kiloton warheads. American sea-based strategic missiles have eight or ten warheads of either 40 or 100 kilotons and are carried on submarines which have either 16 or 24 missiles. 13

American strategic bombers, the B-52 and B-1, carry free-fall gravity bombs in the one megaton range, along with air-launched cruise missiles (ALCM) and short-range attack missiles (SRAM) with 200 and 170 kiloton warheads, respectively. 14

The approximate ratios of these delivery systems and their corresponding warheads in the U.S. strategic inventory are 17 percent bombers carrying 33 percent of U.S. strategic nuclear weapons, 30 percent submarines with 48 percent of the warheads, and 53 percent land-based missiles which carry 19 percent of the American strategic nuclear arms. 15

13. Id.

14. Id., at 201. Cf. Turner, supra note 2, at 89 n.3 (giving bomber-borne nuclear weapons as including five different types of bombs with yields of seventy kilotons to nine megatons).

15. Turner, supra note 2, at 33; IJSS, supra note 2, at 222. See appendix C.

b. The Soviet Union

The USSR currently is said to have deployed some 10,716 strategic nuclear weapons. ¹⁶ The Soviets use delivery systems similar to those of the United States, but with a much heavier dependence on land-based missiles.

The approximate make-up of the Soviet strategic nuclear forces' delivery systems and warheads is 11 percent bombers carrying only 7 percent of the strategic nuclear warheads, 37 percent submarine-launched ballistic missiles with 27 percent of the warheads, and 52 percent intercontinental land-based missiles with some 66 percent of Soviet strategic weapons. ¹⁷ Soviet land-based strategic missiles carry from one to ten warheads, with each warhead having between 100 kiloton to one megaton explosive yields. Soviet sea-based strategic missiles have one to six warheads, with yields also of 100 kilotons up to one megaton. Russian strategic bombers carry gravity bombs with yields of five, twenty, and fifty megatons, along with air-launched cruise missiles having warheads of either 250 kilotons or one megaton. ¹⁸

16. IISS, supra note 2, at 222. See appendix B. Compare Turner, supra note 2, at 89 (who estimates the Soviet strategic stockpile may consist of between 9,132 to 19,198 warheads, as of 1985, using low and high estimates of weapon systems load capabilities, including reloads).

17. Turner, supra note 2, at 33; IISS, supra note 2, at 222. See appendix C.

18. IISS, supra note 2, at 206.

c. Others

Three other countries with significant strategic nuclear forces are Great Britain, France, and the People's Republic of China. These states are estimated to have approximately 686, 514, and 251-321 nuclear warheads in their inventories, respectively, including both strategic and theater/tactical nuclear systems. 19

2. Theater/Tactical Nuclear Weapons

Theater and tactical nuclear weapons include all delivery systems with ranges less than 5,500 kilometers. Theater weapons are intermediate-range (2,400-5,500 km) and medium-range (800-2,400 km) systems, such as missiles and aircraft, which can strike throughout a theater of war, such as Central Europe might become. By comparison, tactical nuclear weapons are intended for use on a particular battlefield. Tactical weapons are defined, generally, as those with ranges under 800 kilometers. 20

a. The United States

The United States is estimated to have more than 11,000 theater and tactical nuclear weapons in its present inventory. 21 These warheads are delivered by a variety of platforms, including land-based and sea-based tactical aircraft, short to intermediate range ballistic missiles,

19. Turner, supra note 2, at 94. See appendix D.

20. See, e.g., IISS, supra note 2, at 207 n.a.

21. Turner, supra note 2, at 90. See appendix E.

cruise missiles, artillery, mines, and depth charges. The yields of these warheads vary from 0.01-15 kilotons in land mines and 0.1-12 kilotons in artillery shells up to 1.45 megatons in free-fall bombs, with most in the 1-100 kiloton range. 22

b. The Soviet Union

The Soviet theater/tactical nuclear arsenal is said to number approximately 13,900 weapons. 23 Delivery systems include a similar variety of platforms as those of the United States, including aircraft, missiles, artillery, cruise missiles, and anti-submarine missiles and torpedoes. Warhead yields vary from 1-4 kilotons up to one megaton. 24

B. Nuclear War Strategies

In analyzing the legality of nuclear weapons employment under international humanitarian law, it is helpful to at least briefly summarize the principle strategic theories under which nuclear weapons might be employed.

1. U.S. Nuclear Strategies

a. Massive Retaliation

American military strategy for using nuclear weapons has undergone significant evolution since 1945, with the first fully articulated nuclear strategy, the policy of "massive retaliation", being put forth by the Eisenhower

22. Id.

23. Id., at 91. See appendix F.

24. Id.

administration in 1954. 25 Under this doctrine, given a vast superiority in nuclear arms vis a vis the Soviet Union, the United States declared its intention to respond to Soviet conventionally-armed aggression anywhere in the world by using nuclear strikes against the Soviet homeland. 26

b. Mutual Assured Destruction

Rapid Soviet weapons developments, especially of the hydrogen bomb and intercontinental ballistic missiles, quickly decreased the deterrent effect of the massive retaliation policy by changing the strategic nuclear balance to one of mutual threat. Consequently, American nuclear policy changed to one of "mutual assured destruction" (MAD) under the Kennedy administration, together with a strategy of "controlled" or "flexible" response in which threats could be met with appropriate conventional or nuclear forces. 27

These concurrent policies sought to reduce the risk of

25. See, e.g., D. Snow, The Nuclear Future 1-34 (1983) (which provides an excellent summary of and commentary upon the evolution of U.S. and Soviet strategic doctrines). See also, Rowen, The Evolution of Strategic Nuclear Doctrine, in Strategic Thought in the Nuclear Age 131 (L. Martin ed. 1979); Richelson, Population Targeting and US Strategic Doctrine, 8 J. of Strategic Stud. 5-21 (1985).

26. D. Snow, supra note 22, at 3. See also Richelson, supra note 25 (giving specifics of U.S. strategic nuclear plans and targets; for example, FLEETWOOD, the 1948 war plan, called for 133 nuclear weapons to be dropped on 70 Soviet cities, with eight targeted on and intended to destroy 40 square miles of Moscow).

27. Id., at 6-12; Richelson, supra note 25, at 10..

nuclear war and insure the credibility of nuclear deterrence by increasing the ability to respond with conventional arms to low-level conventional threats, while preserving a nuclear option in response to a massive Soviet invasion of Western Europe. In the event the United States itself was attacked by a nuclear first-strike, these strategies intended to respond with appropriate nuclear forces in a second-strike retaliation, up to and including the ability after an all-out nuclear attack to insure annihilation of the aggressor's society. 28

The doctrine of flexible response also attempted to emphasize "counterforce" targeting of military resources, while holding "countervalue" targeting of industrial and population centers for retaliation, if necessary. However, due to inaccurate weapons and the great destructive force of thermonuclear devices at the time, "...the plain fact was that even an accurate attack on most military forces would produce large-scale damage and civilian casualties from direct weapons effects, to say nothing of delayed effects from residual radiation." 29 Even with more accurate nuclear weapons today, the results may be similar.

c. Countervailing Strategy

As more accurate delivery systems and smaller yield nuclear warheads were developed, flexible response evolved

28. D. Snow, supra note 25, at 6-12.

29. Id., at 7.

into "limited nuclear options" (LNO) under President Nixon's National Security Memorandum (NSDM) 242 of January 1974. 30 It then became a "countervailing" strategy under the Carter administration, which issued Presidential Directive (PD) 59 calling for greater emphasis on counterforce targets and reduced incidental, or collateral, damage to civilians. 31 This policy has been reconfirmed by President Reagan in National Security Decision Directive (NSDD) 13, but the targeting of Soviet cities has been retained throughout these changes to U.S. strategic doctrine for purposes of deterrence and, if need be, retaliation. 32

d. Targeting Categories

The U.S. Department of Defense has officially stated that it has four categories of targets against which nuclear weapons might be used: Soviet nuclear forces, the Soviet military and political leadership, conventional military forces, and economic and industrial targets which support war-fighting or contribute to economic recovery. 33

30. Richelson, supra note 25, at 11.

31. Id. at 12.

32. Id. at 5 (noting, at 13-15, that even a counter-force attack on the Soviet Union would cause tens of millions of civilian casualties unless targets in urban areas were not attacked, or unless very small nuclear warheads, not now in the U.S. strategic inventory, were used against them).

33. Department of Defense Authorization for Appropriations, Fiscal Year 1981: Hearings Before the U.S. Senate Committee on Armed Services, 96th Cong., 2d Sess., pt. 5, at 2721 (1980) (testimony of William J. Perry, Under Secretary of Defense for Research and Development).

These target categories encompass over 40,000 potential targets: more than 2,000 nuclear forces targets, including missile silos, warhead storage areas, airfields, and submarine bases; 3,000 leadership targets, such as command posts and communications facilities; 15,000 conventional military targets, including bases, supply depots, airfields, vehicle storage yards, air defense installations, and marshalling points; and 15,000 economic and industrial targets, ranging from ammunition and military vehicle factories, to oil refineries, railway yards, electronics factories, ports, civil airfields, and power, steel, coal, cement, and aluminum plants. 34

It would not take forty thousand nuclear warheads, however, to destroy these targets. Due to the clustering of many such targets, especially in urban areas, and the incredible destructiveness of nuclear weapons, one warhead can often destroy many targets.

Soviet military writings indicate that Soviet targeting plans have similar categories and priorities: "[The initial Soviet missile strike would be a massive strike on the] aggressor's means of nuclear attack and simultaneous mass destruction of vital installations comprising the enemy's military, political, and economic might...." 35

34. Id.

35. V. Savkin, Basic Principles of Operational Art and Tactics 92 (1972), reprinted in 4 Soviet Military Thought (1974).

2. Soviet Nuclear Strategy

Soviet strategic nuclear doctrine evolved in stages, similar to American nuclear policy. In the early 1950's, while the U.S. had nuclear superiority and a massive retaliation strategy, Soviet leaders and military theorists denied that nuclear weapons would be decisive in war. After developing a significant nuclear capability, however, the Khrushchev government emphasized nuclear over conventional forces, demobilizing almost one-half of the Soviet Army. 36

During the 1960's and 1970's, like the U.S., Soviet doctrine gradually emphasized a strategy of balanced nuclear and conventional capabilities. 37 The essence of Soviet strategy, however, has been an emphasis on having a "war-fighting" ability rather than a deterrent force, although deterrence is a natural by-product. Since "war survival," at least at a level higher than the enemy, is necessary to a war-fighting strategy, Soviet theorists have emphasized the importance of preemptive strikes, and active civil and military defenses, to "prevail" in a nuclear war. 38

American strategic objectives, then, have been primarily war-averting: deterrence, sufficiency, and retaliation.

36. J. Lockwood, *The Soviet View of U.S. Strategic Doctrine* 29-30 (1983).

37. *Id.* at 33.

38. *Id.* at 35-38.

Yet, to deter adequately, the U.S. has felt it necessary to have a credible capability for "war-fighting". Soviet strategic objectives, rooted in the Russian historical experience of repelling repeated invasions, have been oriented to war-fighting: victory through offensive action and numerical superiority. Deterrence has been a secondary, but inevitable, result of Soviet nuclear strategy. 39

The nuclear strategies of both the United States and the Soviet Union, thus, now emphasize balanced conventional and nuclear forces able to fight any type of war, especially nuclear. Both threaten the other, but a fair analysis must conclude that due to the tremendous destructive power of nuclear weapons neither the Soviet nor American nuclear strategy actually seeks nuclear war, although both have planned for and are prepared to wage nuclear war. 40

C. Potential Effects of Nuclear Weapons Employment

The physical effects of nuclear explosions are the final, yet most important, factual input required for a valid analysis of the legality of nuclear weapons use. These effects will be examined both individually and collectively: that is, the specific phenomena resulting from a single nuclear explosion, and the cumulative effects of multiple detonations.

39. Dyson, On Russians and Their Views of Nuclear Strategy, in The Nuclear Reader 95, 98-99 (C. Kegley & E. Wittkopf eds. 1985).

40. Id. at 99; D. Snow, supra note 25, at 18-22.

1. Types of Nuclear Explosions

The effects of a nuclear explosion vary according to the location of the detonation in relation to the earth's surface. 41 Given this fact, nuclear explosions can be divided into five basic types: air, high-altitude, surface, underground, and underwater. 42

a. Air Bursts

Air bursts are defined as those which detonate below 100,000 feet in altitude but high enough so the fireball does not touch the ground. In air bursts most of the energy produced by the explosion forms a shock wave, with thermal radiation the second greatest effect. 43

b. High Altitude Bursts

In high altitude bursts, defined as those which occur above 100,000 feet, the lack of atmosphere means that less energy becomes a shock wave and more becomes thermal radiation. The amount of nuclear radiation, however, is essentially the same regardless of the type of burst, although radiation from high altitude bursts is less of a threat to humans since it is highly dispersed and will lose

41. U.S. Dep't of Defense & U.S. Dep't of Energy, The Effects of Nuclear Weapons 9 (S. Glasstone & P. Dolan 3d ed. 1977) [hereinafter Glasstone & Dolan] (also published as U.S. Dep't of Army Pam. 50-3, 1977)(widely considered to be the primary reference work on the effects of nuclear weapons explosions).

42. Id.

43. Id.

much of its effect by before it reaches the ground. 44

c. Surface Bursts

Surface bursts are those which detonate on the earth's surface or somewhat above it, and in which the fireball touches the ground. This type of burst creates the most nuclear radiation in the form of fallout particles due to the amount of dirt and debris sucked up into and contaminated by the fireball. 45

d. Subsurface Bursts

Both underground and underwater nuclear explosions have similar effects and can, therefore, be collectively called subsurface bursts. Subsurface bursts are those in which the center of the explosion occurs beneath the ground or water surface. In these detonations most of the shock energy occurs as underground or underwater shock, and thus less air blast is created. Additionally, much of the thermal radiation and nuclear radiation is absorbed by the earth or water. Depending on the depth of the detonation, however, the amount of fallout can be greater than in an air or high altitude burst due to larger quantities of contaminated dirt or water being expelled. 46

2. Effects of Nuclear Explosions Generally

Nuclear explosions produce three principle effects:

44. Id. at 10.

45. Id. at 10-11.

46. Id. at 11.

blast, thermal radiation, and nuclear radiation. 47

a. Blast

Roughly fifty percent of the energy released by an air burst nuclear explosion is in the form of air shock. 48 Most of the material damage caused by such a nuclear explosion comes from the blast, or shock wave. 49 This blast wave is caused by the explosion and the rapid expansion of hot gases in the fireball, since the pressure initially generated in the nuclear detonation is about one million times normal atmospheric pressure. 50

The blast wave produces both rapid increases in air pressure (static over-pressure) and high winds (dynamic pressure). 51 The over-pressure crushes some objects, such as buildings, while the wind blows over objects like people and trees. 52

As an example of these effects, at ground zero for a one megaton air burst, the over-pressure is twenty pounds per square inch (psi) and the wind is 470 miles per hour.

47. Id. at 1-2. See also, Office of Technology Assessment, U.S. Cong., The Effects of Nuclear War 15-26 (rev. ed. 1984)[hereinafter OTA]; Bright, Nuclear Weapons as a Lawful Means of Warfare, 30 Mil. L. Rev. 1 (1965)(which provides a useful summary of nuclear weapons effects).

48. Glasstone & Dolan, supra note 38, at 7.

49. Id. at 80.

50. Id. at 27, 80.

51. OTA, supra note 47, at 16.

52. Id.

Since people can tolerate up to thirty psi, most casualties would result from buildings collapsing on people, or from people being blown against solid objects or objects hurtling into people. 53

Three miles from the explosion, the over-pressure of ten pounds per square inch would still level most buildings and the wind would reach 290 miles per hour. Even at eleven miles away, the wind would be 35 miles per hour and would endanger people by flying glass and debris. 54

b. Thermal Radiation

Approximately 35 percent of the energy of the nuclear explosion is expended as heat and light, which precedes the blast wave by several seconds. 55 Temperatures created by every nuclear explosion are estimated at "several tens of million degrees" as compared to 9,000 degrees Fahrenheit for a conventional high-explosive detonation. 56

In a one megaton air burst, the initial flash of light can cause temporary "flashblindness" out to 53 miles at night and 13 miles in daylight, but its more serious consequence is that it can cause third degree burns on exposed skin out to five miles, which are often fatal without special medical care, and moderately severe burns

53. Id. at 19.

54. Id. at 18.

55. Id. at 20.

56. Glasstone & Dolan, supra note 41, at 27.

out to twelve miles. 57 Approximately one-third of the fatal casualties at Hiroshima and Nagasaki were caused by flash burns. 58

Thermal radiation also causes fires, in addition to those which might be started by blast damage. Such fires may coalesce in urban areas into "firestorms", like those in World War II caused by the massive conventional bombings which destroyed Hamburg, Dresden, and Tokyo, or like the nuclear firestorm at Hiroshima. 59 As will be described in more detail below, fires may also be the most ecologically damaging of all nuclear effects due to the smoke and pollutants they create.

c. Nuclear Radiation

The remaining fifteen percent of the energy created by nuclear detonations is expended as nuclear radiation. 60 This radiation takes two forms: direct and residual. 61 Direct (or initial) radiation occurs within one minute of the explosion and constitutes approximately five percent of the energy from an explosion, while residual radiation

57. OTA, supra note 47, at 21 (noting that the United States has medical facilities for between 1-2,000 severe burn cases, while a single nuclear explosion might produce as many as 10,000 burn victims); Glasstone & Dolan, supra note 41, at 9, 276-323.

58. Bright, supra note 47, at 8.

59. OTA, supra note 47, at 21.

60. Glasstone & Dolan, supra note 41, at 7.

61. Id. at 2; OTA, supra note 47, at 19.

(including fallout) makes up the final ten percent or so of all released energy. 62

Direct radiation is made up of gamma rays and neutrons, which travel great distances in air and penetrate even thick materials. 63 For example, in a one megaton explosion initial radiation could be fatal to persons one mile from the explosion even if protected by 24 inches of concrete. 64 In small kiloton weapons, unlike larger nuclear devices, the direct radiation has greater lethal range than the blast or thermal radiation. 65

Radiation energy is measured in "roentgen" and radiation doses are measured in "rem" (for "roentgen-equivalent-man"). Generally speaking, a dose of 300 rem in a period of 6-7 days will cause severe illness in many victims and kill about ten percent of those so exposed. By comparison, a dose of 450 rem is expected to kill one-half of the people exposed to it in such a period of time, and exposure to 600 rem in that time frame would be fatal to nine out of ten persons, with death coming within a few weeks. It should be noted, however, that doses as small as 50 rems may eventually produce fatal cancer in up to 2.5 percent of an exposed

62. Glasstone & Dolan, supra note 41, at 7-8 (noting that residual radiation is less in a fusion, or thermonuclear, explosion and makes up about five percent of the energy created).

63. Id. at 8.

64. Id. at 325.

65. Id.; OTA, supra note 47, at 19.

population. 66

Residual radiation results from residual weapons debris and from the interaction of neutrons with various elements in the land, sea, and air which makes those substances radioactive. 67 In terms of lethality in the immediate area of the blast, residual radiation is clearly less important than the effects of direct radiation, blast, and thermal radiation. Thus, the primary hazard from residual radiation is in the form of fallout of radioactive particles which can affect areas well outside the region of immediate weapons effects. 68

Fallout is especially severe for surface and subsurface bursts in which the fireball touches the ground. 69 "Early" fallout, which lands within 24 hours, is much more dangerous than "delayed" fallout, because radioactivity decreases by a factor of ten for every seven hours after the explosion. 70 Thus, seven hours after a nuclear explosion the radioactivity dose rate is one-tenth of what it was initially, and at 49 hours it is one-hundredth of the original level.

For this reason, the early fallout carried by local

66. OTA, supra note 47, at 19-20. See also, Glasstone & Dolan, supra note 41, at 575-617.

67. Glasstone & Dolan, supra note 41, at 387.

68. Id.

69. Id. at 388.

70. Id. at 391; Bright, supra note 47, at 5; OTA, supra note 47, at 23.

winds is much more hazardous than fallout which is carried high into the stratosphere and which may not come down for some years. 71 The area and intensity of fallout radiation obviously depends heavily on local weather conditions. In either case, the biological effects of early or delayed fallout are the same as for initial radiation: those exposed to enough radiation will die and lesser exposures will create radiation sickness which will compound any other injuries suffered by other weapons effects. 72

d. Other Effects

Secondary effects of nuclear explosions include transient-radiation effects on electronics (TREE), ionization of the atmosphere, and electromagnetic pulse (EMP). 73 By far the most serious of these is EMP, an electromagnetic wave caused by all nuclear explosions through the production of thousands of volts of electricity in one-hundredth of the time a bolt of lightning takes to do so. EMP will burnout or shutdown unprotected communications and other electronic equipment, at ranges of many hundreds of miles in a high-altitude burst. 74

71. OTA, supra note 47, at 23; Glasstone & Dolan, supra note 41, at 388.

72. OTA, supra note 47, at 23, 26.

73. Glasstone & Dolan, supra note 41, at 349-53, 462-513, 514-39.

74. Id. at 519; OTA, supra note 47, at 22.

3. Specific Effects of a Single Nuclear Weapon

Using Hiroshima as an example, the specific effects of a single small nuclear weapon can be stated accurately. The atomic bomb dropped on Hiroshima at 8:15 A.M. on August 6, 1945, was a small fission weapon of 12 kilotons which detonated at about 1800 feet altitude in an air burst. 75

The immediate results were lethal radiation levels of 1000 rads within a one kilometer radius of the point of explosion ("ground zero"), a firestorm in an area with a radius of two kilometers from ground zero, the almost total destruction of 13 square kilometers of the center city due to blast, and the death of as many as 140,000 individuals by the end of 1945. 76

Long-term consequences of the atomic bombing of Hiroshima included further injuries and deaths by acute radiation sickness, cancer, blood disorders at a rate four times the normal average, eye diseases, and psychoneurological disorders. 77

75. The Aftermath, at 15-16 (J. Peterson ed. 1983) [hereinafter Aftermath] (on estimated human and ecological consequences of nuclear war).

76. Id. at 16-19 (listing the estimated total population at Hiroshima as 350,000 at the time). Cf., Bright, supra note 47, at 8 (citing Glasstone & Dolan, supra note 41, at 544, and giving much lower casualty figures of 68,000 killed and 70,000 injured out of a total estimated population of 256,000; the later figures, however, are limited to casualties within 3.1 miles of the explosion and may also be for initial casualties immediately after the bombing).

77. Id. at 20.

Turning to the estimated damage that a more modern nuclear weapon might cause, the blast alone from a one megaton air burst above a city would likely destroy everything within two miles of ground zero, leave only skeletons of steel-reinforced buildings out to four miles, destroy all homes and heavily damage all commercial buildings out to eight miles, and shatter all glass out to twelve miles. 78

The thermal radiation would cause combustion of all flammable materials within three to five miles, possibly igniting a firestorm, cause severe second degree burns as far away as ten miles, and result in flash blindness or retinal burns in any one looking at the explosion as far away as thirty miles. 79

Mortality would be one hundred percent within two miles and fifty percent within four miles, with another forty percent seriously injured and likely to die without extensive medical care, and twenty five percent of the population out to twelve miles would be injured. 80 Since most medical facilities would be destroyed, the number of further deaths from burns and epidemics would be considerable without outside medical aid.

In summary, the immediate effects of a one megaton weapon would create a circle of damage twenty-five miles

78. Bates, supra note 7, at 722.

79. Id.

80. Id.

wide, with almost total destruction in an inner circle fifteen miles in diameter. In addition, if the explosion were a ground burst it would create significant radiation damage. Radiation would be lethal within two weeks to unsheltered persons within approximately 700 square miles downwind, assuming a fifteen mile per hour steady wind. People living in an area of 14,000 square miles downwind, an oblong roughly 45 miles wide by 440 miles long, would ingest and breath radioactive particles the rest of their lives. 81

4. Combined Effects of Multiple Nuclear Weapons

Many recent studies have built upon the scientific findings about individual nuclear weapon effects just reviewed above to determine the potential effects of multiple nuclear explosions. 82 To begin with, one study points out that the atomic bombings of Hiroshima and Nagasaki are not valid indicators of what nuclear war would be like since they were comparatively very small weapons, they were air bursts which did not create large quantities of fallout, and the Japanese economy and society were sufficiently intact, together with American aid, to provide outside assistance in recovering from the devastation. 83

81. Id. at 725.

82. E.g., M. Harwell, Nuclear Winter (1984). See infra note 92 (for references to other studies). See appendix G (summarizing, in chart form, the effects of multiple nuclear weapons explosions resulting from a large-scale nuclear war).

83. Id. at 1.

One of the seminal studies on the combined ecological effects of mass nuclear detonations, *The Fate of the Earth* by Jonathan Schell, predicted that an all-out nuclear war would kill almost all mammals, birds, fish, and trees in the affected countries, leaving less radiation-sensitive species such as insects and grass as the principal survivors. 84

Schell also estimated that even a "limited" nuclear war in which only 300 one-megaton weapons struck the United States would kill seventy-five percent of the American population, sixty percent by blast and fires and another ten to fifteen percent by radiation. 85 He further estimated that the U.S. economic system would be nearly one hundred percent destroyed, and that millions of the surviving population would be without medical care and would die from their injuries or from epidemics created by the millions of corpses and the reduced resistance to infection caused by radiation. 86

Since one megaton is equal to approximately 80 Hiroshima-size bombs, 300 megatons would be some 24,000 times Hiroshima in force. This "limited" nuclear strike would be totally beyond human experience or comprehension, yet it would involve only a tiny fraction, about one-fiftieth, of today's nuclear arsenals.

84. J. Schell, supra note 3, at 61-65.

85. Id. at 66.

86. Id. at 68.

Another recent study used a 5,800 megaton war scenario, about one-third of current inventories, to assess ecological and human consequences. It found that "...all the major cities in the Northern Hemisphere will be reduced to rubble by blast and... 60-90 percent of their populations will be annihilated by blast and thermal radiation." 87 A further five to twenty percent of the population would be expected to die from radiation within weeks. 88

This same study estimated that this level of damage equates to some 750 million immediate deaths and 340 million seriously injured, one-third of whom would not be psychologically able to care for themselves. It also predicted that epidemics, cancer, and genetic defects would be wide-spread, while pests and insects would multiple rapidly. In addition, fires and dust would create a severe petrochemical smog which would block sunlight sufficiently to wipe out agriculture in the Northern Hemisphere, causing wide-spread famine among those who survived initially. 89

The study concluded that the modern economic superstructure of nearly every country in the Northern Hemisphere would be almost totally destroyed, and this consequently would cause mass starvation and epidemics in Third World nations of the Southern Hemisphere who depend on imports of

87. Aftermath, supra note 75, at 68.

88. Id. at 70.

89. Id. at 162-63.

fertilizers, food, fuel, machinery, and financial aid from the industrialized states of the Northern Hemisphere. 90

Finally, it found that it would be virtually impossible for the high-technology societies of the Northern Hemisphere to ever recover in a meaningful sense. 91 Thus, the blast, fire, and radiation effects of nuclear weapons may be matched or even overshadowed the environmental effects.

Other studies of the effects of multiple nuclear explosions have reached similarly dire conclusions. 92 Most disturbing of all recent findings, one widely-cited inquiry found that "... the most striking and unexpected consequence of our study is that even a comparatively small nuclear war can have devastating climatic consequences.... There is an indication of a very rough threshold at which severe climatic conditions are triggered - around a few hundred nuclear explosions over cities." 93

90. Id.

91. Id. at 144.

92. See, e.g., Comm. on Atmospheric Effects of Nuclear Explosions, Nat'l Research Council, *The Effects on the Atmosphere of a Major Nuclear Exchange* (1985); *The Environmental Effects of Nuclear War* (J. London & G. White eds. 1984); Turco, Toon, Ackerman, Pollack & Sagan, Global Atmospheric Consequences of Nuclear War, 222 *Science* 1293 (1983) (often cited by the authors initials as the "TTAPS" study) [hereinafter TTAPS]; O. Greene, supra note 2; M. Harwell, supra note 82; Sagan, supra note 3; OTA, supra note 47.

93. Sagan, supra note 3, at 267 (an excellent summary of the TTAPS study, supra note 92).

This same study estimated that if as few as five hundred warheads, with only 100 megatons total force, less than one percent of the present nuclear arsenals, were exploded on cities it would trigger similarly devastating environmental effects as a 5,000 megaton exchange. 94

The predicted result has often been referred to as "nuclear winter", in which the dust and smoke created by nuclear explosions would block out sufficient sunlight to create a "twilight gloom or worse" during daytime and drop temperatures in the Northern Hemisphere to an average of minus twenty degrees Celsius for three months or more. 95 This would hinder photosynthesis sufficiently to destroy agriculture, and most terrestrial and aquatic plants and their ecosystems, in the Northern Hemisphere. 96

In the last one thousand years the maximum temperature deviations in the Northern Hemisphere, or globally, have been about one degree Celsius, and the average temperature drop for an Ice Age has been ten degrees Celsius; a 100 megaton attack on cities would likely cause temperatures to fall over thirty degrees for three months or more. 97

Of equal concern is the finding that a counterforce strike against either superpower's nuclear forces, which has

94. Id. at 266.

95. Id.

96. Id.

97. Id. at 274.

been estimated to require 2,200 - 4,500 warheads, also would exceed the climatic threshold. Some 2,000 - 3,000 surface bursts against non-urban military targets, such as missile silos, would be likely to create sufficient atmospheric dust to bring on nuclear winter without any urban fires. 98

Thus, a purely counterforce first-strike by either side, with only four to six percent of today's total warheads and without any nuclear retaliation whatsoever by the defender, may well mean national suicide for the attacker and the destruction of the rest of the Northern Hemisphere, with severe impacts on the Southern Hemisphere.

D. Factual Conclusions

Briefly summarized, then, the present factual setting for possible nuclear weapons employment involves over 50,000 nuclear weapons, comprising approximately 18,000 megatons of explosive force. A relatively "small" nuclear weapon by current standards, one of 100 kilotons, is over eight times as powerful as the bomb which devastated Hiroshima. There are, admittedly, many thousands of tactical nuclear weapons of much smaller size and effect than this. There are also thousands of much larger warheads in the present inventories of every nuclear-armed nation. 99

In addition, the scientific studies cited above, among others, indicate it is highly possible that the detonation

98. Id. at 276.

99. See supra, at 5-9, text and accompanying notes.

over urban targets of less than one percent of the world's total nuclear weapons would cause an ecological catastrophe for the Northern Hemisphere, and possibly the entire planet. A "major" nuclear war, involving only one-third of today's nuclear weapons, would almost certainly do so.

This, then, is the present factual framework underlying the nuclear weapons question. It is necessary to understand the factual context, especially the numbers and effects of nuclear weapons, in order to properly analyze the legality of employing nuclear weapons under international humanitarian laws of coercion control.

The legal framework for the analysis, including the sources and basic principles of the international humanitarian law of coercion control, will be considered next.

SECTION II

LEGAL FRAMEWORK FOR ANALYSIS

A. Sources of International Humanitarian Law

As a subset of international law, the rules and principles of humanitarian law originate from the same sources of law, and law-creating processes, as do other international legal norms. Article 38 of the Statute of the International Court of Justice states the sources as: international conventions, international custom, and general principles of law recognized by civilized nations, with judicial decisions and teachings of highly qualified legal scholars as secondary means of ascertaining the law. 100

The judgment of the International Military Tribunal at Nuremberg explicitly stated that these are the sources of the international humanitarian law:

The law of war is to be found not only in treaties, but in the customs and practices of States which gradually obtained universal recognition, and from the general principles of justice applied by jurists and practiced by military courts. This law is not static, but by continual adaptation follows the needs of a changing world. Indeed, in many cases treaties do no more than express and define for more accurate reference the principles of law already existing. 101

100. Statute of the International Court of Justice, June 26, 1945, art. 38, 59 Stat. 1031, T.S. 993 (effective October 24, 1945) [hereinafter Stat. of I.C.J.]. See also, I. Brownlie, Principles of Public International Law 2 (1966); J. Brierly, The Law of Nations 56 (6th ed. 1963) (both authors citing Art. 38 as authoritative in regard to its list of sources of international law).

101. 1 Trial of the Major War Criminals Before the Int'l Mil. Tribunal 221 (1947) [hereinafter I.M.T.].

B. Use of Coercive Force Under International Law

Before discussing particular humanitarian norms, however, it is important to understand the broader context of international law within which humanitarian rules exist. Ever since Grotius, international law has been traditionally divided into two realms: jus in bellis, the law of war, and jus ad bellum, the law of peace.¹⁰² The law of peace provides, among its many norms, rules on when the use of coercion is permissible or prohibited, while the law of war specifies lawful and unlawful tactics and weapons.¹⁰³

Within the law of peace, conventional and customary, resort to coercive force has been circumscribed beyond past traditional bounds by the contemporary minimum world public order system. The Kellogg-Briand Pact, the decision of the International Military Tribunal at Nuremberg, and the United Nations Charter have all declared the aggressive use of coercion to be unlawful.¹⁰⁴

102. H. Grotius, *De Jure Belli ac Pacis Libris Tres* (1625), in 3 *Classics of International Law* (Kelsy trans. 1915).

103. See generally, 1 L. Oppenheim, *International Law: Peace* (8th ed. Lauterpacht 1955); 2 L. Oppenheim, *International Law: Disputes, War, and Neutrality* (7th ed. Lauterpacht 1952) [hereinafter Oppenheim-Lauterpacht]; Stockholm International Peace Research Institute, *The Law of War and Dubious Weapons* (1976) [hereinafter SIPRI].

104. Kellogg-Briand Treaty for Renunciation of War as an Instrument of National Policy, 27 August 1928, 46 Stat. 2343, T.S. 796, 94 L.N.T.S. 57 [hereinafter Kellogg-Briand]; 1 I.M.T.; U.N. Charter art. 2, para. 4 ("All members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state....").

Thus, lawful coercion is now limited to defensive purposes, as exemplified by Article 51 of the U.N. Charter, which authorizes members to exercise their inherent right of individual or collective self-defense. 105 Members may also use coercion pursuant to U.N. or regional enforcement actions to restore and maintain international peace and security. 106

A claim of lawful use of coercion, then, whether by conventional or nuclear weapons, must be first tested against the international legal norm against aggression. Whether in aggression, defense, or under a U.N. or regional peace-keeping arrangement, however, any use of coercive force, legal or illegal, also must meet the legal strictures on uses of force imposed by the international humanitarian law of coercion control. 107

C. Basic Principles of International Humanitarian Law

As a general matter, humanitarian law, more traditionally referred to as the law of war or law of armed conflict, was initially customary law. It remained so until the later

105. U.N. Charter art. 51.

106. U.N. Charter ch. VII, arts. 42, 43; ch. VIII, arts. 52, 53.

107. See, e.g., Mallison, The Laws of War and the Juridical Control of Weapons of Mass Destruction in General and Limited War, 36 Geo. Wash. L. Rev. 308, 312 (Dec. 1967), reprinted in W. Mallison & S. Mallison, Studies in the International Law of Armed Conflict 316 (1978); E. Fessler, Directed Energy Weapons 84 (1979). See generally 2 Oppenheim-Lauterpacht, supra note 103, at 331-33.

half of the 19th century, when multilateral treaties began to codify and expand upon the customary norms. 108

An international law scholar, Fritz Kalshoven, has said that "[t]he fundamental principle underlying the whole structure of the international humanitarian law applicable in armed conflicts is the belligerents shall not inflict on their adversaries harm out of proportion to the legitimate goals of warfare." 109 Professors McDougal and Feliciano had previously posited this same idea in its simplest form by their emphasis on the fact that the laws of coercion control are intended to minimize the unnecessary destruction of human and material values. 110

To effectuate this minimization of destruction, two fundamental principles underlie all the humanitarian law of coercion control. These two major principles are: military necessity and humanity. 111 An excellent definition of the former states: "Military necessity is the principle which

108. E.g., F. Kalshoven, *The Law of Warfare* 24 (1973).

109. Id. at 27.

110. M. McDougal & F. Feliciano, *Law and Minimum World Public Order* 530 (1961) [hereinafter McDougal & Feliciano].

111. E.g., Id., at 521-30 (citing chivalry as traditionally a third basic principle of the law of war, but questioning its role in modern warfare). See also, 2 Oppenheim-Lauterpacht, supra note 103, at 227; Mallison, supra note 107, at 312-13. Cf. U.S. Dep't of A.F., *International Law -- The Conduct of Armed Conflict and Air Operations* para. 1-3a(3) (1976) (A.F. Pam. 110-31) [hereinafter AFP 110-31] (stating that the principle of chivalry remains valid and is reflected in specific prohibitions against poison, misuse of enemy flags and uniforms, treacherous misconduct, etc.).

justifies measures of regulated force not forbidden by international law which are indispensable for securing the prompt submission of the enemy, with the least possible expenditures of economic and human resources." 112

The phrase "not forbidden by international law" makes clear that the principle of military necessity does not incorporate the 19th Century German doctrine of Kriegsraison, which asserted the right to employ any military measure necessitated by the military situation regardless of its legality. 113 This is reflected in the most basic principle of humanitarian law, which was stated in the regulations annexed to the Hague Convention IV of 1907: "The right of belligerents to adopt means of injuring the enemy is not unlimited." 114 This principle has become a customary norm implicit in all humanitarian laws.

The second major principle of humanitarian law, the rule of humanity, "...forbids the infliction of suffering, injury, or destruction not actually necessary for the

112. AFP 110-31, supra note 111, para. 1-3a (AFP 110-31 is not directive in nature and does not promulgate official U.S. Government policy; it refers, however, to U.S. Government, Department of Defense and Air Force policy throughout). See id. at i.

113. E.g., id. at 1-6; 2 Oppenheim-Lauterpacht, supra note 103, at 232.

114. Regulations Respecting the Laws and Customs of War on Land, Annex to Hague Convention IV, 18 October 1907, art. 22, 36 Stat. 2227, 2231, T.S. 539, 543 [hereinafter Hague Regulations].

accomplishment of legitimate military purposes." 115
According to the St. Petersburg Declaration of 1868,
"...the only legitimate object which States should endeavor
to accomplish during war is to weaken the military forces
of the enemy." 116 Thus, a requirement to distinguish
between combatants and non-combatants has long been recog-
nized as fundamental to the humanity principle in both
customary and conventional humanitarian law. 117

Included within the principle of humanity are important
subsidiary norms, including, among others: the requirement
for proportionality, the prohibition on causing unnecessary
suffering, and the proscription on using indiscriminate
weapons. 118

Looking briefly at these key subsidiary norms, the
proportionality rule mandates "...a reasonable relation
between the amount of destruction carried out and the
military importance of the object of attack." 119

115. AFP 110-31, supra note 111, para. 1-3a(2).

116. Declaration Renouncing the Use in Time of War of
Explosive Projectiles Under 400 Grammes Weight, December
11, 1868, Preamble, 138 Parry's T.S. 298, 298 [hereinafter
Declaration of St. Peterburg].

117. See, e.g., 2 Oppenheim-Lauterpacht, supra note 103, at
346.

118. E.g., AFP 110-31, supra note 111, para. 1-3a(2).

119. Mallison, supra note 107, at 312 (citing propor-
tionality as an implicit requirement within the principle of
military necessity rather than humanity). See also, AFP
110-31, supra note 111, para. 6-3a.

Stated differently, proportionality requires that incidental or collateral injury to civilians and civilian property caused by the application of military force cannot be so excessive in relation to the military advantage sought as to be tantamount to an intentional attack upon civilians or a wanton disregard for their safety. 120

The humanity principle also forbids the use of weapons and methods of warfare apt to cause unnecessary suffering or superfluous injury. 121 This prohibition first appeared in the preamble to the St. Petersburg Declaration, which declared that legitimate military objectives would "...be exceeded by the employment of arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable [and]... would therefore be contrary to the law of humanity." 122

The Hague regulations of 1907 incorporated this same principle in article 23(e), which bans the use of "...arms, projectiles or material calculated to cause unnecessary suffering". 123 It is now a fundamental customary norm.

The third important subsidiary norm of the principle

120. W. Parks, *The Rule of Proportionality in a Nutshell* (1987) (unpublished study).

121. AFP 110-31, supra note 111, para. 6-3b.

122. Declaration of St. Petersburg, supra note 116, Preamble.

123. Hague Regulations, supra note 114, art. 23(e).

of humanity is the prohibition on indiscriminate weapons and methods of warfare. This proscription follows from the proportionality and unnecessary suffering rules. Weapons and methods of warfare are not illegal just because they cause incidental injuries to civilians or civilian property, but indiscriminate weapons or fighting methods are unlawful.

AFP 110-31 states the rule as follows: "Indiscriminate weapons are those incapable of being controlled, through design or function, and thus they can not, with any degree of certainty, be directed at military targets." 124

Indiscriminate weapons or methods may also be those which, while targetable on military targets, have uncontrollable effects which may then cause disproportionate civilian injury or damage. 125

An often cited example of the former type of indiscriminate weapon is the German V-1 rocket, whose crude guidance system precluded accurate targeting; an example of the latter is biological weapons, whose effects cannot be controlled in space or time and, thus, necessarily risk civilian injury excessive to the military advantage sought.

D. Binding Nature of Humanitarian Norms

As was mentioned briefly in regard to the military necessity principle, the basic norms of humanitarian law enumerated above are binding on all states and other

124. AFP 110-31, supra note 111, para. 6-3c.

125. Id.

international actors by virtue of their customary law status. 126 It is sufficient to note here, as Professors Oppenheim and Lauterpacht have written: "As soon as usages of warfare have by custom or treaty evolved into laws of war, they are binding upon belligerents under all circumstances and conditions, except in the case of reprisals as retaliation against a belligerent for illegitimate acts of warfare." 127

The binding nature of humanitarian norms is also reflected in the judicial opinions. Thus, for example, the United States Military Tribunal in United States v. List held: "The rules of International Law must be followed even if it results in the loss of a battle or even a war." 128

E. Per Se Illegality Versus Prohibited Uses

There are basically two types of legal controls on weapons under the international humanitarian law: first, some weapons are per se illegal and any use of them is forbidden; second, lawful weapons may be used in unlawful ways. 129 This distinction between unlawful weapons and

126. E.g., id. at para. 1-3b.

127. 2 Oppenheim-Lauterpacht, supra note 103, at 231.

128. 11 Trials of War Criminals Before the Nuernberg Military Tribunals Under Control Law No. 10, at 1277 (1947).

129. See, e.g., McDougal & Feliciano, supra note 110, at 664; Mallison, supra note 107, at 328-29; AFP 100-31, supra note 111, para. 5-2.

unlawful uses of legal weapons is central to application of the law of coercion control.

Poison is an example of an unlawful weapon, banned per se by international law. 130 And, as previously mentioned, also forbidden per se are weapons or methods of war which cause unnecessary suffering. The difficulty is in deciding which weapons or methods do so. As noted in International Law -- The Conduct of Armed Conflict and Air Operations:

What weapons or methods of warfare cause unnecessary suffering, and hence are unlawful per se, is best determined in the light of the practices of states. All weapons cause suffering. The critical factor in the prohibition against unnecessary suffering is whether the suffering is needless or disproportionate to the military advantages secured by the weapon, not the degree of suffering itself. 131

Examples of unlawful uses would be the use of a lawful weapon against non-combatant civilians rather than against military targets, or when the amount of force used is clearly disproportionate to the military objective sought. Thus, the use of any weapon in war, no matter how unquestionably legal the weapon may be, such as a normal bullet, must meet the overriding customary requirements of military necessity and humanity to be lawful. 132

The legality of any weapon, then, should be determined through a three-part analysis: by examining international

130. Hague Regulations, supra note 114, art. 23(e).

131. AFP 110-31, supra note 111, para. 9-3b(2) (emphasis in the original).

132. See, e.g., Mallison, supra note 107, at 133.

conventions for express prohibitions, by comparison with per se prohibitions in international agreements as to other weapons which may indicate an implied per se illegality, and by assessing whether the weapon's effects exceed customary restrictions. This same analytical framework has been set forth in AFP 110-31:

A weapon or method of warfare may not be considered illegal solely because it is new or has not previously been used in warfare. However, a new weapon or method of warfare may be illegal, per se, if it is restricted by international law including treaty or international custom. The issue is resolved, or attempted to be resolved, by analogy to weapons or methods previously determined to be lawful or unlawful. In addition to analogy, the legality of new weapons or methods of warfare is determined by whether the weapon's effects violate the rule against unnecessary suffering or its effects are indiscriminate as to cause disproportionate civilian injury or damage to civilian objects. The military advantage to be secured by use of the weapon must be compared with the effects caused by its use.¹³³

The analysis of the legality of employing nuclear weapons which follows will use this three-part test.

F. Sanctions for Violations of the Humanitarian Law

Without the possibility of enforcement, the international humanitarian rules of coercion control would be illusory. The primary sanctions are those of self-interest, which are self-enforcing: these involve the military doctrines of economy of force, conservation of resources, and military effectiveness, as well as the fear of reciprocal treatment; secondary sanctions, those which are asserted against others, include diplomatic protest, public opinion,

133. AFP 110-31, supra note 111, para. 6-7.

resort to regional and international bodies such as the United Nations, legal claims for reparation, the threat of criminal proceedings for war crimes, and the threat of and use of reprisals. 134

Many of these sanctions are negative, in the sense that they constitute some form of counter-action against the offender. A positive sanction acting to prevent violations of the laws of coercion control, often overlooked, is an appreciation of the common humanity of all persons. 135

G. The Impact of Modern War on Humanitarian Norms

Two historical developments during the past century have made it increasingly difficult to maintain the basic distinction between combatants and non-combatants depended upon in humanitarian norms. These are the emergence of total war and mass destruction weapons. 136 Both phenomena are inherent in the question of nuclear weapons.

Total war refers to "...the idea that entire populations should be mobilized in the war effort...". 137 Unfortunately, this has led to a blurring of the combatant-non-combatant line. As Bailey has written, "It is only too

134. See, e.g., Bristol, The Laws of War and Belligerent Reprisals Against Enemy Civilian Populations, 21 A.F. L. Rev. 397, 409-10 (1979); Mallison, supra note 107, at 314-15; Kalshoven, supra note 108, at 107-08.

135. Mallison, supra note 107, at 336.

136. S. Bailey, Prohibition and Restraints in War, at 36 (1972).

137. Id.

easy to assume that the adversary is not the enemy's armed forces, but his whole society. And if his whole society is the adversary, it is argued, his whole society becomes a legitimate target for attack." 138

Clearly, attacks directed at civilians remain unlawful, but enormous amounts of "unintended" collateral injury to completely innocent civilians have come to be accepted in modern warfare "...even though it was expected and indeed inevitable." 139 This was certainly true in the aerial bombardment campaigns of World War II, and may have become even more so with the advent of nuclear weapons. 140

H. Application to Nuclear Weapons: Divergent Views

Before examining specific international conventional and customary legal limitations on nuclear weapons, it seems

138. Id., at 37. Compare the proposed, but never adopted, Hague Rules of Aerial Warfare art. 24(3)(1923), reprinted in 17 Am. J. Int'l L. Supp. 245 (1923): "In cases where the [military] objectives...are so situated that they cannot be bombarded without the indiscriminate bombardment of the civilian population, the aircraft must abstain from bombardment."

139. Id.

140. See 2 Oppenheim-Lauterpacht, supra note 103, at 530 (positing that indiscriminate strategic target-area bombing in World War II was unlawful when judged by the combatant-non-combatant standard, but that it was not prosecuted at Nuremberg as a war crime due to the doctrine of tu quoque, roughly equivalent to the domestic legal doctrine of clean hands). Cf. Carnahan, The Law of Aerial Bombardment in Its Historical Context, 17 A.F. L. Rev. 39, 60 (1975)(contending that most of the apparent violations of the laws of aerial bombardment in World War II were the result of inaccurate bombing technology and reprisals taken in error because of it). See also Kalshoven, supra note 108, at 42-86 (noting the reaffirmation of civilian protections in recent international law developments).

useful to summarize briefly the two principal viewpoints on their legality under international law. 141 One view is that the use of nuclear weapons would be illegal per se under the humanity and proportionality principles, among other norms, due to their tremendous destructiveness and the risk of uncontrolled escalation should any use be made of them. 142 The opposing view contends that nuclear weapons are legal because they are not prohibited specifically as a lawful weapon by any conventional or customary norm of international law, and because they serve to preserve minimal world public order through deterrence even though certain potential uses might violate humanitarian norms. 143

I. Official U.S. and Soviet Views of Legality

The United States appears to have taken the later view on the legality of nuclear weapons expressed above: "The United States takes the position that the use of nuclear

141. See Almond, Deterrence Processes and Minimum Order, 4 N.Y. L. Sch. J. Int'l & Comp. L. 283, 309 (1983).

142. See, e.g., Meyrowitz, The Laws of War and Nuclear Weapons, 9 Brooklyn J. Int'l L. 227 (1983); Falk, Toward a Legal Regime For Nuclear Weapons, 28 McGill L. Rev. 519 (1983); G. Schwarzenberger, The Legality of Nuclear Weapons (1958); N. Singh, Nuclear Weapons and International Law (1959). See also R. Lifton & R. Falk, Indefensible Weapons (1982) (for moral and philosophical objections).

143. See, e.g., McDougal and Feliciano, supra note 110, at 659-68; Mallison, supra note 107, at 332-33; Bright, supra note 47, at 1; Reisman, Nuclear Weapons in International Law, 4 N.Y. L. Sch. J. Int'l & Comp. L. 339 (1983); Almond, supra note 139, at 309-12; Weston, Nuclear Weapons Versus International Law, 28 McGill L. Rev. 542 (1983) (although the author concludes that the vast majority of potential uses of nuclear weapons are unlawful under humanitarian law).

weapons is not unlawful. Such use is subject to political restraints, however, and is also governed by existing principles of international law." 144 This statement seems to indicate clearly that customary humanitarian norms, as well as relevant international agreements, must be applied to the employment of nuclear weapons.

There is some dispute, however. Professor Rubin, among others, contends that the official U.S. position is that there are presently no legal limitations on the use of nuclear explosives. 145 He cites The Law of Land Warfare as implying this view: "The use of explosive 'atomic weapons,' whether by air, sea, or land forces, cannot as such be regarded as violative of international law in the absence of any customary rule of international law or international convention restricting their employment." 146

Professor Rubin goes on to say that this "official" interpretation is incorrect as there are certainly international humanitarian norms, such as the humanity principle, presently restricting lawful employment. 147 In the

144. U.S. Dep't of A.F., Commander's Handbook on the Law of Armed Conflict para. 6-4 (1980) (A.F. Pam. 110-34) [hereinafter AFP 110-34].

145. Rubin, Nuclear Weapons and International Law, 8 Fletcher F. 45, 57-58 (1984).

146. U.S. Dep't of Army, The Law of Land Warfare para. 35 (1956) (U.S. Army Field Manual 27-10) [hereinafter FM 27-10]. See also AFP 110-31, supra note 111, para. 6-5 (using language almost identical to that in FM 27-10).

147. Rubin, supra note 145, at 58.

opinion of this author, the language of FM 27-10 (and AFP 110-31), although unclear and amenable to either interpretation, should be read as stating that any use of nuclear weapons would be subject to international customary and conventional norms.

Other statements by U.S. authorities tend to confirm that the official U.S. position does view nuclear weapons use as restricted by humanitarian law. Foremost among these is the Department of Defense (DOD) policy on humanitarian law set out in DOD Directive 5100.77, which states: "The Armed Forces of the United States will comply with the law of war in the conduct of military operations and related activities in armed conflict however such conflicts are characterized." 148 Significantly, key American military commanders who must adhere to this policy believe that it requires them to apply humanitarian law in nuclear warfare. 149

Furthermore, the United States has taken the position that humanitarian law applies to nuclear weapons in debates in international fora. For example, a U.S. representative to the United Nations stated in a 1968 debate that existing

148. U.S. Dep't of Defense Directive 5100.77, Department of Defense Law of War Program, para. V a (5 November 1974) [hereinafter DOD Dir. 5100.77].

149. See, e.g., Dougherty, The Psychological Climate of Nuclear Command, in Managing Nuclear Operations 407, 422 (A. Carter, J. Steinburger & C. Zraket eds. 1987) (General Russell Dougherty, former commander of Strategic Air Command, citing DOD Dir. 5100.77, id., as applying to "nuclear commanders").

international law principles on the use of weapons in warfare apply equally to the use of nuclear and similar weapons. 150

Finally, the legal guidance provided to naval officers in the Commander's Handbook on the Law of Naval Operations clearly applies humanitarian norms in determining lawful uses of nuclear weapons. It states:

There are no rules of customary or conventional international law prohibiting nations from employing nuclear weapons in armed conflict. In the absence of such an express prohibition, the use of nuclear weapons against enemy combatants and other military

150. See, eg., AFP 110-31, supra note 111, at 5-17 n.18: "Rovine, Contemporary Practice of the United States Relating to International Law, 67 Am. J. Int'l L. 118, 122-125 (1973) (quoting DOD, General Counsel, letter to the effect that Resolution 2444 is 'declaratory of existing customary international law.'). The initial draft of that resolution included a fourth principle 'that the general principles of the law of war apply to nuclear and similar weapons.' The Soviet delegation moved to delete this fourth principle on the ground that it did not conform to earlier UN resolutions condemning nuclear weapons. The US opposed the Soviet amendment. The US Representative, Mrs. Jean Picker, stated on 10 December 1968:

The four principles set out in the resolution constitute a reaffirmation of existing international law...

(3) There are indeed principles of law relative to the use of weapons in warfare, and these principles apply as well to the use of nuclear and similar weapons. The United States believes that the above principles are statements of existing international law on this subject.

At the conclusion the sponsors of the resolution accepted the Soviet amendment, but only on the understanding that the remaining principles [that the right to adopt means of injuring the enemy is not unlimited, that it is prohibited to attack the civilian population as such, and that distinction between combatants and non-combatants must be made at all times to spare civilians as much as possible] were applicable in all armed conflict regardless of their nature or the kinds of weapons used."

objectives is lawful. Employment of nuclear weapons is, however, subject to the following principles: the right of the parties to a conflict to adopt means of injuring the enemy is not unlimited; it is prohibited to launch attacks against the civilian population as such; and the distinction must be made at all times between persons taking part in the hostilities and members of the civilian population to the effect that the latter be spared as much as possible. 151

Looking at the other major nuclear power, the Soviet Union apparently takes the opposite official position, that the use of nuclear weapons would violate both the letter and spirit of international law. 152 The Soviets do not, however, consider the possession of or the threat to use nuclear weapons to be illegal. 153 This position reflects, of course, the officially declared policy of all nuclear powers: that their possession of nuclear weapons is for the primary purpose of nuclear deterrence.

Utilizing this background on international humanitarian law and the factual framework previously provided, the next sections will analyze specific conventional and customary humanitarian rules relevant as they may apply to nuclear weapons to assess the legality of employing nuclear weapons in armed conflicts.

151. U.S. Dep't of Navy, Commander's Handbook on the Law of Naval Operations para. 10.2.1 (July 1987) (Naval Warfare Pub. 9) [hereinafter NWP-9].

152. Berman, Soviet Views on the Legality of Nuclear Weapons, 9 Brooklyn J. Int'l L. 259, 261 (1983).

153. Id.

SECTION III

EXPRESS LIMITATIONS UNDER INTERNATIONAL CONVENTIONS

Numerous multilateral and bilateral treaties restrict nuclear weapons in various ways, but, as Burns Weston has written and as will be shown, "...no international covenant forbids expressly the development, manufacture, stockpiling, deployment, or use of nuclear weapons in general." 154

A. Agreements to Prevent Accidental Nuclear War

Although of vital importance, by definition these agreements do not prohibit the possession or use of nuclear weapons, but are rather deigned to minimize the risk of an accidental nuclear war. The 1963 Hot Line Agreement set up a crisis communications system between Washington and Moscow. 155 The 1971 Accidents Measures Agreement obligated each side to notify the other of planned missile launches towards the other's territory and of missile warning system detections of unidentified objects. 156 Finally, the 1973 Prevention of Nuclear War Agreement, which committed the U.S. and USSR to consult whenever a deterioration in

154. Weston, supra note 143, 552-53 (emphasis in the original). See also Paust, Controlling Prohibited Weapons and the Illegal Use of Permitted Weapons, 28 McGill L. J. 608, 610-11 (1983).

155. Direct Communications Link Memorandum of Understanding, 20 June 1963, United States-USSR, 14 U.S.T. 825, T.I.A.S. 5362 (entered into force 20 June 1963).

156. Measures to Reduce the Risk of Nuclear War Outbreak Agreement, 30 September 1971, United States-USSR, arts. 3 & 4, 22 U.S.T. 1590; T.I.A.S. 7186 (entered into force 30 September 1971).

relations threatens to cause nuclear war. 157

B. Agreements Restricting Nuclear Explosions

Like the preceding agreements, the following treaties affect nuclear weapons only indirectly. The Limited Test Ban Treaty of 1963 between the United States, Great Britain, and the Soviet Union proscribed the testing of nuclear weapons or any "other" nuclear explosion in the atmosphere, in outer space, or underwater. 158 The 1974 Threshold Test Ban Treaty, which is signed but unratified, limits U.S. and Soviet underground nuclear weapons tests to 150 kilotons or less. 159 Another unratified agreement between the U.S. and USSR is the 1976 Peaceful Nuclear Explosions Treaty, which forbids underground nuclear explosions for peaceful purposes in excess of 150 kilotons or group explosions aggregating over 1.5 megatons. 160

In regard to the legal status of unratified agreements, it should be noted that signature of an international agreement imposes a duty of good faith efforts to refrain

157. Prevention of Nuclear War Agreement, 22 June 1973, United States-USSR, art. IV, 24 U.S.T. 1478, T.I.A.S. 7654 (entered into force 22 June 1973).

158. Nuclear Test Ban Treaty, 5 August 1963, art. 1, 14 U.S.T. 1313, T.I.A.S. 5433, 480 U.N.T.S. 43 (entered into force 10 October 1963; ratified by 110 states as of 31 December 1982).

159. Center for Defense Information, The Unraveling of Nuclear Arms Treaties, 16 Defense Monitor 6 (1987) (hereinafter C.D.I.).

160. Id.

from acts which would be contrary to the object and purpose of the treaty lasting until the signatory state ratifies or rejects the agreement. 161

These agreements limit peacetime nuclear weapons explosions and may, thereby, place indirect limitations on nuclear weapons by somewhat restricting development, but they do not purport to place legal limits of any sort on wartime employment of nuclear weapons.

C. Agreements Limiting Nuclear Weapons Deployments or Use

The Antarctic Treaty of 1959 is a multilateral treaty which declares that Antarctica can be used only for "peaceful purposes" and that all measures of a "military nature" were prohibited, including military bases, fortifications, maneuvers, or the testing of any weapons. 162 Further, the treaty prohibits "[a]ny nuclear explosions in Antarctica", but this does not appear to be a militarily significant limitation due to Antarctica's remote location and lack of strategic value. 163

161. See I. Brownlie, supra note 100, at 565; 1 Oppenheim-Lauterpacht, supra note 103, at 909; Weston, supra note 143, at 566. See also Vienna Convention on the Law of Treaties, 23 May 1969, arts. 11, 18, 24-25, 8 I.L.M. 679 (not in force for the U.S., but generally accepted as declaratory of customary international law in many respects and, thus, binding on the U.S. as to those matters).

162. Antarctic Treaty, December 1, 1959, 12 U.S.T. 794, T.I.A.S. 4780, 402 U.N.T.S. 71, art. I (entered into force for the U.S. 23 June 1961) (presently ratified by twenty-six states).

163. Id. at art. V. para. 1.

State parties to the 1967 Outer Space Treaty, including the United States and the Soviet Union, agreed inter alia to not place nuclear or other mass destruction weapons in orbit around the earth, "install" them on celestial bodies, nor "station" them in space in any other manner. 164

Similarly, the Moon Treaty of 1979 declares the moon shall be used only for peaceful purposes; prohibits the threat or use of force on the moon; forbids military bases, fortifications, weapons testing and maneuvers; and bans nuclear and other mass destruction weapons from being placed, orbited, or sent on a trajectory around the moon, or used there. 165 Neither the United States nor the Soviet Union, however, is a party to the Moon Treaty.

Significantly, neither space agreement purports to restrict the passage of ballistic missile nuclear warheads through outer space, which is the most likely and threatening military use of outer space relevant to international conflicts on earth. The supposed limitations are, therefore, mostly ephemeral.

Another convention limiting nuclear weapons is the 1967 Latin American Nuclear Free Zone Treaty which prohibits the

164. Outer Space Treaty, 27 January 1967, art. IV, 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (entered into force for the U.S. 10 October 1967; ratified by eighty-one states as of 31 December 1982).

165. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 18 December 1979, art. III, 13 I.L.M. 1434 (1979) (U.N. Doc. A/34/664, 12 November 1979) (not in force for the U.S.).

possession, deployment, or use of such weapons in Latin America. 166 This agreement creates legal limits which affect the nuclear powers in that it prevents the deployment of nuclear weapons into Latin America.

Furthermore, Article 3 of Additional Protocol II to the treaty, signed by both the United States and Great Britain, provides that the nuclear state parties will not use nuclear weapons against non-nuclear signatories. 167 The USSR is not, however, a party and is not bound by the non-use in Latin America rule. Ironically, the very existence of this treaty restricting nuclear weapons has been cited by commentators as evidence that without such agreements no prohibition on nuclear weapons exists in international law. 168

Two further agreements directly affect the super-power's nuclear arsenals. The first, the 1968 Nuclear Non-Proliferation Treaty, inter alia, prevents the United States and Soviet Union from providing nuclear weapons to non-nuclear states or aiding them in acquiring or control-

166. Treaty for the Prohibition of Nuclear Weapons in Latin America, 14 February 1967, art. I, 634 U.N.T.S. 281 (entered into force for twenty-four states on 31 December 1982) (also called the Treaty of Tlatelolco).

167. Additional Protocol II to the Treaty for the Prohibition of Nuclear Weapons in Latin America, 14 February 1967, 22 U.S.T. 754, T.I.A.S. 7137, 634 U.N.T.S. 364 (entered into force for the U.S. 12 May 1971 and for the U.K. 11 December 1969).

168. SIPRI, supra note 103, at 52.

ling such weapons, but does not restrain the possession or use of these devices by the existing nuclear powers. 169 The second, the 1971 Seabed Treaty, prohibits installation of nuclear weapons or other mass destruction devices on or under the ocean floor; yet, like each of the agreements examined thus far, it does not constrain the most likely military uses, including the use of the oceans as a medium of operations for nuclear-armed ships and submarines. 170

D. Agreements Limiting Numbers of Nuclear Arms.

There are presently no international agreements limiting the numbers of nuclear weapons which the present nuclear powers may possess. 171

The Strategic Arms Limitation Treaty of 1972, a bilateral agreement between the United States and the Soviet Union, limited the number of land-based intercontinental ballistic missile (ICBM) launchers either country could have to the number existing on 1 July 1972, and it also limited the number of submarine-launched ballistic missiles (SLBM) and ballistic missile submarines either

169. Treaty on the Non-Proliferation of Nuclear Weapons, 1 July 1968, art. I, 21 U.S.T. 483, T.I.A.S. 6829 (entered into force for the U.S. 5 March 1970) (hereinafter: Nuclear Non-Proliferation Treaty).

170. Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof, 11 February 1971, 23 U.S.T. 701, T.I.A.S. 7337 (entered into force for the U.S. on 19 May 1972) (hereinafter: Seabed Treaty).

171. C.D.I., supra note 159, at 1.

The respondents to the survey also indicated that the most common reason for the lack of information was the lack of time to read the materials. However, the survey also indicated that the most common reason for the lack of information was the lack of time to read the materials.

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although the Soviet government has announced it will continue to unilaterally observe the treaty limitations "for the time being".¹⁷ Nonetheless, it is clear that SALT II has ceased to have binding legal effect under international law as a constraint on nuclear weapons.

This examination of the pertinent express limitations placed upon nuclear weapons by international conventions demonstrates that there are indeed no present explicit legal prohibitions outlawing the use of nuclear weapons in strategic theaters, as has been shown in brief, the type of legal limitations which do exist under international agreement do not restrict the key military methods of employing nuclear weapons in the probable theaters of conflict. Present explicit limits on the use of nuclear weapons apply to remote areas such as outer space or Antarctica, or to militarily impractical or undesirable uses such as the use of nuclear weapons.

It is the desire, therefore, to examine next whether there exist implied limitations under international or other forms of law.

¹⁷ See, e.g., *supra* note 12, at 111.

SECTION IV

IMPLIED LIMITATIONS UNDER INTERNATIONAL CONVENTIONS

As Professor Mallison has noted: "All individuals who cherish moral values, and human life itself, must be appalled by the destructiveness of [nuclear] weapons. Correspondingly, humanitarians wish devoutly that they may be accurately characterized as illegal." 178 Indeed, many scholars of international law contend that nuclear weapons employment would violate conventional and customary international humanitarian law. They rely, in part, upon arguments grounded in implied limitations based upon certain international conventions.

For purposes of the present analysis, the key arguments and conventions relied upon by proponents of implied illegality under international conventions will first be briefly summarized, then comment upon these arguments and critical analysis of the terms of the cited conventions will follow in the next section.

A. Arguments in Support of Implied Conventional Limitations

1. Unnecessary Suffering and Poison Prohibitions

The first convention usually cited by those who argue that international conventions contain implied legal limitations against using nuclear weapons is the preamble to the St. Petersburg Declaration of 1868, already mentioned, forbidding the use of weapons "which would uselessly

178. Mallison, supra note 107, at 329.

aggravate the sufferings of disabled men, or render their death inevitable." 179 Article 23(e) of the Hague Regulations, already mentioned above, banning the use of "arms, projectiles or material calculated to cause unnecessary suffering" is also cited, as is Article 22, stating that "the right of belligerents to adopt means of injuring the enemy is not unlimited." 180

Among early proponents of nuclear weapons illegality, Dr. Singh, for one, argues that the radiation effects of nuclear weapons, including radiation-induced diseases, cause wide-spread unnecessary suffering making the use of nuclear weapons illegal under these conventions. 181 Others, such as Meyrowitz and Schwarzenberger, also emphasize article 23(a) of the Hague Regulations which prohibits poison and poisoned weapons. They argue that radiation and radioactive fallout produce effects indistinguishable from poisons and that nuclear weapons are, therefore, "prima facie" illegal poisonous weapons. 182

2. Rights of Neutrals

Another early convention often cited against use of

179. Declaration of St. Petersburg, supra note 116, preamble. See also Meyrowitz, supra note 142, at 233.

180. Hague Regulations, supra note 114, at arts. 22, 23(e).

181. N. Singh, supra note 142, at 148-52; see also, Meyrowitz, supra note 142, at 234.

182. See, e.g., Meyrowitz, supra note 142, at 235; G. Schwarzenberger, supra note 142, at 26-36.

nuclear weapons is the 1907 Hague Convention on the Rights and Duties of Neutrals, which states: "The territory of neutral Powers is inviolable."¹⁸³ This principle has been cited as creating a legal right for neutral states to be free from injury within their territory caused by the belligerent activities of other states, with a concomitant right to compensation for damages.¹⁸⁴ The argument is then made that this convention implicitly makes the use of nuclear weapons illegal since the large scale use of nuclear weapons would result in uncontrollable effects, such as radioactive fall-out, severely damaging to neutrals, a violation of this humanitarian norm.¹⁸⁵

3. Gas and Bacteriological Weapons Prohibitions

Legal scholars arguing that nuclear weapons are illegal also cite the 1925 Geneva Gas Protocol, prohibiting "asphyxiating, poisonous, or other gases" and "all analogous liquids, materials or devices".¹⁸⁶ Prof. David Pion-Berger, among others, contend that nuclear weapons are analogous to poison gas since they "are capable of

183. Hague Convention (No. 5) Respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land, 18 October 1907, art. 1, 36 Stat. 2257, T.S. No. 180, at 654 (entered into force for the U.S. 15 February 1913).

184. Weston, supra note 144, at 554.

185. Meyrowitz, supra note 144, at 144.

186. Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, 17 June 1925, art. 1, 20 Consol. T.S. No. 8061, 94 L.N.T.S. 65 (hereinafter "Geneva Protocol").

air-space" and contaminate objects they contact just as poisonous gases do. 187 Commentators citing this convention stress that its language is "so comprehensively phrased as to include any weapons of an analogous character, irrespective of whether they were known or in use at the time of the signature of the Protocol." 188

Other conventions cited to establish the implicit illegality of nuclear weapons include the 1925 Convention on the Prohibition of Bacteriological and Toxin Weapons, which supplements and amplifies the earlier biological weapons prohibition, and the Geneva Gas Protocol of 1925. This agreement bans the use of toxic weapons and delivery systems, but allows weapons that use toxic agents for peaceful purposes such as medicine. 189

The argument made relative to nuclear weapons under these biological weapons conventions is that, and as with chemical weapons, these violate long term, general prohibitions against the development, production, stockpiling, and use of weapons of mass destruction. 190

187. *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101; *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101; *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101.

188. *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101.

189. *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101; *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101; *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101; *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101; *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101.

190. *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101.

191. *Journal of the American Society of International Law*, 1948, Vol. 42, No. 1, at 100-101.

1. Introduction to Environmental Modification

The 1977 Convention on Environmental Modification was a landmark treaty that prohibited the use of nuclear weapons for environmental modification purposes. The treaty was signed by 104 states, including the United States, the Soviet Union, and the United Kingdom.

The treaty defines "environmental modification" as "any human-made intervention in the natural environment, including the climate, the land, the oceans, the atmosphere, and outer space." The treaty also defines "environmental modification of the natural environment" as "any human-made intervention in the natural environment, including the climate, the land, the oceans, the atmosphere, and outer space." The treaty prohibits the use of nuclear weapons for environmental modification purposes.

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5. Protection of Civilians and Indiscriminate Attacks

Other articles of Protocol I also are cited as support for illegality arguments. Article 35(2) restates the basic Hague Regulations rule against weapons and methods of warfare which cause unnecessary suffering.¹⁹⁵ Article 51 contains broad rules for the protection of civilians, including that civilians shall not be the object of attack and "shall enjoy general protection against dangers arising from military operations", that indiscriminate attacks are prohibited, and that civilians may not be made the object of reprisal attacks.¹⁹⁶

Indiscriminate attacks are defined in the convention as including "those which are not directed at a specific military objective", "those which employ a method or means of combat which cannot be directed at a specific military objective" or "those which employ a method or means of combat the effects of which cannot be limited as required by this Protocol".¹⁹⁷ All the above are "of a nature to strike military objectives and civilians objects without distinction."¹⁹⁸ These definitions are central to arguments made that nuclear weapons are incapable of being "discriminating" and are, therefore, illegal.

195. Protocol I, supra note 193, at art. 35.

196. Id. at art. 51.

197. Id.

198. Id.

Types of indiscriminate attacks specifically prohibited by Protocol I include "bombardment by any method or means which treats as a single military objective a number of clearly separated and distinct military objectives located in a city, town, village or other area containing a similar concentration of civilians..." and any "attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects... which would be excessive in relation to the concrete and direct military advantage anticipated". 199 Attacks are defined as "acts of violence against an adversary, whether in offence or in defense". 200 These specific examples of legally prohibited indiscriminate attacks are argued to fit precisely most potential uses of nuclear weapons. 201

Further relevant articles of Protocol I include Article 53, which protects cultural and religious sites from attack, military use, or reprisal; Article 54, which forbids attacks upon objects such as crops, livestock, and drinking water which are "indispensable to the survival of the civilian population"; Article 55, which repeats the prohibition of article 35 against attacks which threaten long-term environmental damage but adds that such attacks may not be made as

199. Id.

200. Id. at art. 49.

201. See, e.g., Meyrowitz, supra note 142, at 250; Falk, supra note 142, at 524; Weston, supra note 143, at 578-81.

reprisals either; and, finally, Article 56, which proscribes attacks on installations and works containing dangerous forces such as dams, dikes, and nuclear power stations even if they constitute a military target, or on nearby military targets, if such an attack may cause "severe" losses among civilians. 202

Those arguing that the use of nuclear weapons is illegal point to these Protocol I provisions and conclude that "Although avoiding explicit reference to nuclear weapons and strategy, Protocol I espouses principles designed primarily to protect the civilian population, which, if reasonably construed, support the conclusion of nuclear illegality." 203

Equally important to the illegality argument is the fact that Protocol I arguably reflects customary international law. Professor Weston contends "[i]t is probable that the Protocol's environmental and civilian population protection provisions are declaratory of emerging customary law and are therefore unaffected by the non-ratifications and declarations of understanding in question". 204

The non-ratifications and understandings to Protocol I of the major nuclear powers will be discussed below, but the

202. Protocol I, supra note 193, at arts. 53-56.

203. Meyrowitz, supra note 142, at 250. See also, Weston, supra note 143, at 556-57; Paust, supra note 154, at 614.

204. Weston, supra note 143, at 567.

point made by proponents of the illegality of nuclear weapons use is that conventions such as Protocol I do, in fact, implicitly limit nuclear weapons and that this is becoming clear through the processes of customary international law-making involving a growing consensus among the vast majority of states, as also will be discussed further.

6. Prohibition of Genocide

A final international agreement cited to prove the illegality using nuclear weapons is the Genocide Convention of 1948.²⁰⁵ This convention is widely accepted as declarative of customary international law and is, therefore, binding on the United States and other non-ratifying states.²⁰⁶

The Genocide Convention provides that genocide is a crime against international law, and defines it as killing or causing serious bodily or mental harm to members of a national, ethnic, racial, or religious group with intent to destroy the group, in whole or in part, or creating conditions of life which are calculated to destroy the group, or imposing measures to prevent reproduction within the group, or forcibly removing children of the group.²⁰⁷

Nuclear war is said to be violative of the Genocide

205. Convention on the Prevention and Punishment of the Crime of Genocide, 9 December 1948, 78 U.N.T.S. 277 (entered into force 12 January 1951) (not in force for the U.S.) [hereinafter Genocide Convention].

206. G. Schwarzenberger, supra note 142, at 46; N. Singh, supra note 142, at 152.

207. Genocide Convention, supra note 205, at arts. 1-11.

Convention. Meyrowitz, for example, argues that because of the destructiveness and radioactivity of nuclear explosions any large-scale use of nuclear weapons "...would meet most, if not all, the criteria defining genocide...". 208

In summary, then, proponents of illegality conclude that the above conventional norms apply to employing nuclear weapons, either by the conventions themselves for states which are parties or by customary law reflected in the wide support of states for the terms of the conventions. 209 If this premise of applicability is true, then one would be forced to conclude, as the cited authors have, that the vast majority of probable uses of nuclear weapons, if not practically all, would violate one or more of the humanitarian norms just considered due to the tremendous destructiveness of the weapons and the long-term residual effects.

B. Arguments Against Implied Conventional Limitations

1. Lack of Explicit Conventional Prohibitions

The first argument against the view that the conventions cited above implicitly limit nuclear weapons is the most obvious and simplest: none of the agreements explicitly can, or even refer to, nuclear weapons. This is why the arguments supporting a claim of illegality, as to nuclear

208. Meyrowitz, supra note 141, at 147. See also G. Schwarzenberger, supra note 141, at 46; N. Singh, supra note 141, at 152; Weston, supra note 141, at 138.

209. See, e.g., Meyrowitz, supra note 141, at 147; Weston, supra note 141, at 138.

weapons must rely on analogy and allegedly implied legal limitations, rather than clear and explicit prohibitions.

Arguments based upon implied, rather than explicit, legal limitations are clearly weaker and more open to dispute. As Malison has noted, "it seems unsound and tenuous to assume illegality in the absence of express and direct conventional agreement." 210

The absence of express legal limitations casts doubt on implied illegality because, as John Norton Moore has commented, "One would have thought that if the issue were simply illegality, it would be approached in an agreement precisely as biological weapons were approached, that is, with a prohibition of manufacture, use of any kind and stockpiling, for example." 211

II. Implied Conventional Limitations Were Not Intended

The second argument against implied illegality, perhaps even stronger, is: no such illegality was intended to be implied by the drafter's of the cited conventions, either directly or by analogy. Many of the key conventions relied upon by proponents illegality "...long preceded the existence, or even the serious contemplation, of nuclear weapons...". 212 It is, thus, difficult to conclude that

210. Malison, supra note 107, at 382.

211. Moore, Nuclear Weapons and the Law, 9 Brooklyn J. Int'l L. 121, 126 (1983).

212. Malison, supra note 107, at 382.

the broad proscriptions against poisonous weapons found in the Hague Convention, or against asphyxiating gas and "analogous" weapons found in the Geneva Gas Protocol, for example, were meant to encompass nuclear devices which were beyond the negotiator's ability even to imagine.

The question is essentially a problem of treaty interpretation. On this very point of the applicability of some of the cited conventions to nuclear weapons, Professors McDougal and Feliciano have stated:

The assumptions which may be seen to underlie the above exercises in analogical interpretation by Dr. Schwarzenberger and others are that words have absolute meanings which can be projected into the future without regard to original and contemporaneous contexts, and that future interpreters must accept these meanings irrespective of facts and policies in contemporary context. 213

This type of error in treaty interpretation has been called the "plain meaning fallacy", and occurs when textual interpretation is based solely upon one possible definition, the "plain meaning", of the words of an international agreement. It does regard being paid to the intent of the negotiators, reflected in the negotiating record, diplomatic correspondence, subsequent state practice, and other

11. See Feliciano, supra note 110, at 664-65.

12. See M. McDougal & W. Reisman, International Perspective 1202-1203 (1981).

13. See McDougal, "textual, 'plain meaning', interpretation," in McDougal, H. Lasswell & J. Miller, The International Law of the Future and World Public Order (1967).

without reviewing in detail the negotiating history of each agreement previously cited. It is sufficient for the purposes of this analysis to note that many drafters who have studied the history of these conventions, both the older agreements and those drafted after the advent of nuclear weapons, doubt that the drafters intended to create such implied limitations on nuclear weapons. 215

As an attorney representing the United States State Department has written: "I think that it just stretches credibility far too much to argue that conventions which were intentionally negotiated by States to accomplish certain narrow prohibitions, also ban nuclear weapons." 216

3. Implied Limitations Contradicted by Other Agreements

Of all the conventions relied upon by proponents of implied illegality, those that were negotiated after the advent of the nuclear age would most logically be expected to include explicit limitations on nuclear weapons if such limitations were intended. This conclusion is supported by actual state practice in regard to nuclear weapons limitations. When states have desired to do so, they have been

215. See generally, Mallison, supra note 107, at 9; McDougal & Feliciano, supra note 110, at 13; Moore, supra note 211, at 73; Reisman, supra note 143, at 16. See also, Cummings, The Role of Humanitarian Law, 9 Brooklyn J. Int'l L. 269, 271 (1983) ("Under [contextual] standards of treaty interpretation, one cannot, in my view, credibly make a case under the narrow standards of the law that States have agreed to ban nuclear weapons.").

216. Cummings, supra note 215, at 273.

conclusion in creating explicit conventional limitations upon nuclear weapons in international agreements, as in the Antarctic and Outer Space treaties previously discussed.

The conclusion that nuclear weapons were not intended to be limited by any implied conventional norm is supported by the negotiating history of Protocol I, for example, whose protections for civilians and the environment and prohibitions on indiscriminate bombardment would otherwise seem to apply to nuclear war. During the lengthy negotiations, the nuclear powers made it extremely clear that they did not intend that Protocol I's norms would apply to nuclear weapons. 217

The head of the U.S. delegation to those negotiations, Ambassador George Aldrich, clearly stated in his report to the United States Secretary of State that no implied limitations on nuclear weapons were intended or agreed to. He wrote:

During the course of the Conference there was no consideration of the issues raised by the use of nuclear weapons. Although there are several articles that could see [sic] to raise questions with respect to the use of nuclear weapons, most clearly, article 55, on the protection of the natural environment, it was the understanding of the United States Delegation throughout the Conference that the rules to be developed were designed with a view to conventional weapons and their effects and that the new rules established by the Protocol were not intended to have any effects on, and do not regulate or prohibit the use of nuclear weapons. We made this understanding several times

217. See, e.g., Meyrowitz, supra note 142, at 250-53 n.89; Moore, supra note 211, at 265.

during the Conference, and it was also stated explicitly by the British and French delegations. It was not contradicted by any delegation so far as we are aware. 218

The United States signed Protocol I on 10 December 1977, but subject to an understanding which made clear its position that the agreement did not implicitly limit nuclear weapons: "It is the understanding of the United States of America that the rules established by this Protocol were not intended to have any effect on and do not regulate or prohibit the use of nuclear weapons." 219

The effect of this understanding has been debated, with some scholars maintaining that it is invalid under international law. Meyrowitz, for example, cites the international legal doctrine that reservations and understandings cannot contradict the essential purposes of the treaty, and contends that the attempt of the U.S. understanding to exclude nuclear weapons from the coverage of Protocol I is, therefore, void. 220

This argument is appealing, especially for those who value human life and wish to foster legal limitations on the use of force in international relations, but it is not especially persuasive. The express contention of the nuclear states throughout the negotiations over Protocol I

218. Dig. U.S. Prac. in Int'l L. 919 (1977).

219. Id. at 920.

220. Meyrowitz, supra note 142, at 253 n.89.

that nuclear weapons were not under discussion indicates that the "essential purpose" of the agreement was to create conventional war limitations only. It seems highly dubious that the most powerful and "specially affected" states could be bound to an entirely different purpose than they clearly intended.

4. Arms Limitation Agreements Ban Only Inefficient Weapons

A more general argument, but one that is historically sound and therefore persuasive, is that arms treaties have generally prohibited only those weapons or uses which have been shown by experience to be militarily inefficient or without overall utility. 221 Poisonous gases, for example, often poisoned friendly troops if the wind shifted, and were even less useful once the enemy was armed with similar weapons and defensive devices such as gas masks. Biological weapons have similarly unpredictable dangers for the user's population. These weapons were subsequently banned through international agreements. 222

In contrast, aircraft and submarines, initially thought to be barbaric innovations, were considered to be perfectly legal once the military efficiency of these weapons became clear. 223 By analogy, nuclear weapons have not yet been

221. See, e.g., Mallison, supra note 107, at 331; Falk, supra note 142, at 531. See also Royce, Aerial Bombardment and the International Regulation of Warfare (1928).

222. Mallison, supra note 107, at 331.

223. Id. at 318-20, 325, 328.

shown to lack military utility, or to be inoffensive. In fact, the only wartime uses ever made of the atomic bomb at Hiroshima and Nagasaki, were justified as "necessary" for hastening the end of World War II.²²⁴

Nuclear weapons also are highly effective as deterrent weapons, used for deterrence purposes. This attribute alone may prevent a total legal ban on such weapons. Unlike poison gas or bacteriological weapons, the widespread use of nuclear arms probably would have unpredictable effects on populations outside the target areas, due to the threat of the possibility of nuclear winter. If an explicit ban on the general use of nuclear weapons is ever concluded, therefore, their deterrent value may result in a no first use agreement as is contained for poison gas weapons in the Geneva Gas Protocol rather than a total prohibition as was agreed to for biological weapons.

B. State Practice Contradicts Implied Prohibitions

Perhaps the most persuasive argument against implied illegality is that such limitations are not recognized by state practice. As Cummings notes, "States, in their practice, do not accept the proposition that it is illegal to either keep nuclear weapons or to use them, if absolutely necessary, against military targets."²²⁵

224. See, e.g., McDougal & Feliciano, supra note 110, at 660-61 n.421.

225. Cummings, supra note 215, at 273.

As Professor McDougal and Reisman have maintained, among other things, law cannot be determined by "defined norms" from the written word. It is not a matter of "interpretation" or "agreement," and any attempt to derive norms from "ancient usage" or "implied norms" does not answer whether the implied norms are normatively supported by "expectations of authority and control supporting a particular norm" or whether those expectations are, in fact, held by the politically relevant actors in that setting." 226

Specifically, in regard to the implied international law limitations on nuclear weapons discussed above, Reisman has concluded that state practice disproves the existence of such norms: "My impression is that the consensus shared by politically relevant actors in the United States and the Soviet Union is exactly the opposite of the implied conventional limitations." 227 The factual analysis made at the beginning of this paper supports this conclusion.

Professors McDougal and Feliciano have similarly concluded that "the effective decision-makers of the contemporary world seem no more likely to accept the nebulous derivations from past agreement and ancient usage considered above than they are to make in present context a

226. Reisman, supra note 143, at 339.

227. Id. at 340.

SECTION V

CUSTOMARY INTERNATIONAL LAW LIMITATIONS ON NUCLEAR WEAPONS

A. Establishing the Relevance of Customary Norms

Even if one concludes that there are no implied conventional prohibitions on nuclear weapons per se, by analogy or otherwise, nor explicit conventional norms effectively limiting the likely uses of these weapons, customary international law provides legal guidelines applicable to all weapons, including nuclear arms, as was established above.

The analysis, thus far, has shown that international law has not declared nuclear weapons to be illegal per se, so the question of illegal use becomes paramount.

The relevance of customary humanitarian law norms to nuclear weapons employments can be seen from the definitions and analysis of the customary norms of military necessity and humanity previously discussed. 231 As has been seen, the use of any legal weapon in war still must meet the legal requirements of military necessity and humanity. 232

This applicability of customary norms in the absence of conventional norms is specifically stated in two of the international agreements already mentioned. The famous

231. See supra, at 33-59, text and accompanying notes. See also Bright, supra note 47, at 38 (citing Stone and Stowell as positing that international law adequately controls nuclear weapons).

232. See, e.g., Mallison, supra note 107, at 333; supra, at 41-43, text and accompanying notes.

"Martens Clause" of the preamble to the Hague Convention IV of 1907 provided that for cases not covered by the Regulations "...the inhabitants and the belligerents remain under the protection and the rule of the principles of the law of nations, as they result from the usages established among civilized peoples, from the laws of humanity, and from the dictates of the public conscience." 233

Similarly, Geneva Conventions Protocol I states that "In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity, and from dictates of public conscience." 234

Even scholars who posit the legality of nuclear weapons under international conventional law concede the applicability of the customary legal norms by acknowledging that nuclear weapons can be used in clearly unlawful ways, such as an attack on a city without a military target (and not as a lawful reprisal), or where the civilian casualties from an attack are clearly disproportionate to the military advantage to be gained. 235

Finally, the applicability of customary rules of

233. Hague Regulations, supra note 114, at Preamble.

234. Protocol I, supra note 193, art. 1, para. 2.

235. See, e.g., Moore, supra note 211, at 264; Bright, supra note 47, at 25; McDougal & Feliciano, supra note 110, at 664; Mallison, supra note 107, at 333.

warfare to nuclear weapons is admitted by the relevant state actors. The United States has officially stated so, including in its military manuals, and the Soviets acknowledge it in their official views on the legality of nuclear arms. 236

B. Formulation of a Customary Legal Standard

Given the applicability of customary humanitarian norms, the relevant legal issue then becomes how to formulate and apply an appropriate test. Professor Mallison has suggested that "[t]he criteria for a weapon to meet the test of lawfulness may be summarized by stating that it must not cause destruction of values disproportionate to the military advantage gained through its use." 237 This test is one of proportionality. In applying this test it is important to realize, as McDougal and Feliciano have put it, that "[i]t is not, however, the simple fact of destruction, not even the amount thereof, that is relevant in the appraisal of such instruments; it is rather the needlessness, the superfluity of harm, the gross imbalance between the military result and the incidental injury that is commonly regarded as decisive of illegitimacy." 238

236. See, e.g., Bright, supra note 47, at 27; Weston, supra note 103, at 571; Mallison, supra note 107, at 333 & n.136; Berman, supra note 152, at 261; Cummings, supra note 215, at 272; supra, at 46-50, text and accompanying notes.

237. See, e.g., Mallison, supra note 107, at 321; Bright, supra note 47, at 39.

238. McDougal & Feliciano, supra note 110, at 615-16.

It is clear, therefore, that legality or illegality under customary rules of warfare will depend upon assessing the use of a nuclear weapon in a particular factual situation. Put most simply, and based upon the factual framework presented above, the factual permutations of possible uses of nuclear weapons can be said to be either offensive or defensive; first or second (retaliatory) strikes; tactical (theater/battlefield) or strategic (intercontinental) strikes; and either for counterforce (targeting military forces) or countervalue (targeting cities and industrial areas). It is to these factual contexts that the test for legality must be applied.

2. Application of Customary Standard to Factual Contexts

1. Illegality of Offensive Uses of Any Kind

As has been noted already, the use of either conventional or nuclear weapons to commit aggression is forbidden by international law, both customary and conventional law. Thus the "offensive" use of any weapon, and certainly of nuclear weapons, is forbidden by international law. Offensive uses are those which are not legally and factually defensive. The critical legal issue, then, is to determine which "defensive" uses are lawful, if any. In this regard, it is important to realize that first strikes with nuclear

239. See Weston, supra note 143, at 575-89 (excellent analytical framework using these factual criteria).

240. See supra, at 34-35, text and accompanying notes.

what he felt might be a more effective defense of his position. He admitted in response to a question from the British delegate that "the legality of the defense is not in question."

240. Arguments of the legalists, however,

legalists would not have been taken into account. The court's dissenting opinion, however, stated that the court, with its knowledge of the long history of the use of nuclear weapons, could not ignore the fact that the use of nuclear weapons would be a war crime. The court's dissenting opinion stated that the use of nuclear weapons would be a war crime. The court's dissenting opinion stated that the use of nuclear weapons would be a war crime.

It is well known that nuclear weapons are not consistent with the principles based on the respect for civilian life and property. They have indiscriminate and devastating effects and are inhumane, cruel and repulsive weapons. The devastation and destruction is such that in a real nuclear war, the suffering is disproportionate to the military gains, because the survival of the peoples involved is at stake, and the existence of mankind might be put in jeopardy.

Similarly, the United Nations General Assembly, stated, through its Resolution 1653 of 1961, that "the use of nuclear... weapons would exceed even the scope of war and cause indiscriminate suffering and destruction to mankind and civilization and, as such, is contrary to the rules of international law and the laws of humanity." 243 The

241. See, e.g., Meyrowitz, supra note 142, at 255; Spaight, Air Power and War Rights 273-77 (3rd ed. 1947).

242. SIPRI, supra note 103, at 50.

243. Declaration on the Prohibition of the Use of Nuclear and Thermo-nuclear Weapons, G. A. Res. 1653, para. 1, 16 U.N. GAOR Supp. (No. 17) at 4, U.N. Doc. A/5100 (1961).

resolution also stated that such use would violate the U.N. Charter and would constitute "a crime against mankind and civilization". 244

The 1978-1979 Rules, however, like some scholars, to distinguish between possible uses in various factual contexts. Its blanket classification of all uses as "aggravated appropriation" is, therefore, legally questionable. It is at best declaratory of an international custom, if at all, despite its broad language and "plain meaning". 245 The vote on the resolution was 55 in favor, 13 against, and 16 abstained. 246 This vote showed inadequate support to conclude that a clear customary norm had emerged.

The recent General Assembly resolutions on the same subject have shown a growing majority in favor of making any use of force illegal, but a significant minority of states, including the United States and its allies, and including three of the major nuclear powers and "developed" nations, indicates that no consensus of international law has arisen yet. 246

244. *Id.*

245. Meyrowitz, *supra* note 141, at 253 n.90; Bright, *supra* note 47, at 3, noting that the Soviet Union and its allies voted in favor and that the United States and the western states voted against, with most Latin American states abstaining.

246. See Weston, *supra* note 143, at 569-70 & n.110.

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THE LEGALITY OF NUCLEAR WEAPONS EMPLOYMENT UNDER THE
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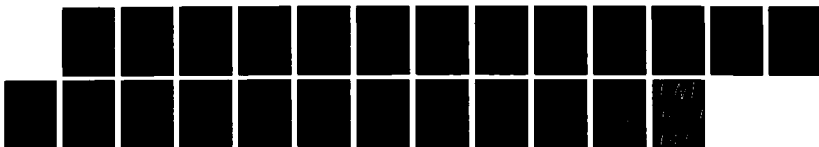
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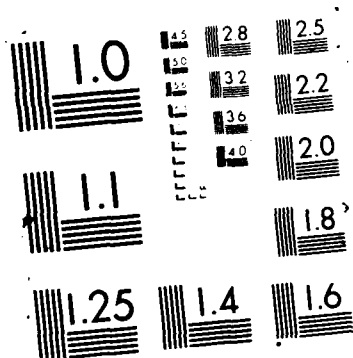
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b. Arguments for Contextual Determinations

More careful legal scholars, applying customary norms of warfare to the various potential factual situations, have concluded that it is possible, at least theoretically, to use nuclear weapons in legal ways. 247 Bright and Weston, for example, contend that it would be lawful to use relatively small, tactical warheads against enemy troops in an area where the effects, including radiation, would not threaten disproportionate civilian casualties. 248 This conclusion appears to be correct, as far as it goes, under the legal analysis made thus far.

The problem, of course, becomes much more difficult under other factual assumptions. For example, a strategic counterforce strike solely against a remote military base may be legal; but it has been estimated that a larger counterforce attack on the land-based ballistic missiles of the United States would kill between two and twenty million civilians, primarily due to radiation effects. 249 It might also cause the ecological disaster of nuclear winter. 250

247. See, e.g., Mallison, supra note 107, at 338; McDougal & Feliciano, supra note 110, at 664; 2 Oppenheim-Lauterpacht supra note 103, at 348-49; Weston, supra note 143, at 586; Bright, supra note 47, at 25.

248. Bright, supra note 47, at 30; Weston, supra note 143, at 586.

249. OTA, supra note 47, at 84.

250. See text supra, at 30-31.

The proportionality between the military advantage gained and the civilian casualties caused in this latter counterforce attack against "purely military" targets is open to serious doubt. 251 This is even more true when one considers that such an attack could not possibly be militarily determinative of assured victory, an arguably sufficient military justification, given the continued existence in this factual situation of other nuclear weapon systems such as ballistic missile submarines and bombers.

The same proportionality issue exists in the use of "tactical" nuclear weapons. First, it should be noted that these weapons would certainly seem to be "strategic" if viewed from the perspective of the citizenry of the nations in which they might be used, such as in central Europe. Second, it has been estimated that even a relatively "small" attack (given the many thousands of warheads on each side) of only one hundred warheads, each with the relatively "small" explosive force of two kilotons or less, would cause between one to ten million civilian dead in Europe. 252

Such casualties caused by the use of tactical nuclear weapons may or may not be proportional to the military result. If the limited use of tactical weapons stopped a massive conventional-arms invasion, it might well be

251. See, e.g., 2 Oppenheim-Lauterpacht, supra note 103, at 348.

252. Meyrowitz, supra note 142, at 248 n.77.

proportional despite a million or more civilian deaths. Certainly it is true that many more civilians died during the Second World War to obtain a similar result.

These estimates of civilian deaths from the limited tactical or strategic uses of nuclear weapons are, however, scenario specific. The entire proportionality calculation rapidly becomes unpredictable if one considers the problem of escalation. No limited use scenario can foreclose the possibility that decision-makers on each side will have significant pressure to counter-strike in kind, or at a higher level, in an attempt to deter further nuclear attacks.

If one adds to this threat of an escalatory spiral the Clausewitzian "fog of war", that is the inevitable lack of accurate information available to decision-makers amidst the confusion of combat, then the likelihood of escalation becomes even greater. For example, intelligence estimates of the number and size of even a few nuclear explosions may well overstate the case given the damage and confusion which such weapons are likely to create. This may cause the receiving side to respond at a higher level of nuclear force. The cycle might then repeat itself until an all-out nuclear exchange has occurred.

As for countervalue scenarios, nuclear attacks against cities and urban industrial targets would almost by definition involve civilian casualties which are disproportionate

to the military advantage which might be gained, absent a war-ending Hiroshima-like situation. 253 Countervalue targeting is the basis for the mutual assured destruction (MAD) theory of nuclear deterrence, and the aptness of the title can be seen from the fact that estimated civilian casualties from an all-out nuclear exchange between the superpowers would be over 300 million dead. 254 These estimates do not even include casualties in other countries caused by fallout or the possibly catastrophic environmental consequences. 255

It is, then, extremely difficult to reach a conclusion on the legality of the use of nuclear weapons even in hypothetical factual situations. Some limited uses against purely military targets can be imagined which would be lawful under the customary international norms governing the use of coercion. The impossibility of ever predicting the real-world consequences of such "lawful" uses, however, given the ever-present threat of nuclear escalation, precludes a definitive answer. Certainly it can be said that the end result might well and truly be disproportionate and illegal, even if the first limited use was lawful.

253. See, e.g., Meyrowitz, supra note 142, at 241; Weston, supra note 143, at 584-85.

254. Meyrowitz, supra note 142, at 247. But see, e.g., Aftermath, supra note 75, at 162 (giving a much higher estimate of 750 million initial deaths in an attack using only one-half of available nuclear weapons inventories).

255. See, e.g., id.

D. Assessments Based on Hiroshima and Nagasaki

One might be able to avoid the analytical uncertainty found in hypothetical factual contexts by examining the legality of the use of nuclear weapons, after the fact, in a real world context. The atomic attacks on Hiroshima and Nagasaki present the only such case. Unfortunately, legal assessments of the lawfulness of these two uses of nuclear weapons have reached opposite conclusions even in this specific factual context.

The only judicial determination ever made on the legality of nuclear weapons use was by a Japanese court in the case of Shimoda v. Japan.²⁵⁶ The plaintiffs in that case sued the Japanese government for failure to assert claims on their behalf for the atomic bombings of Hiroshima and Nagasaki. They contended that the bombings were illegal under international law.

While the court denied recovery on the ground that the plaintiffs lacked standing under international law, it concluded in dicta that the bombings were illegal under customary international law as indiscriminate attacks which caused unnecessary suffering.²⁵⁷ The number of civilians killed in these two attacks has been estimated to be at

256. Shimoda v. Japan, No. 2914 of 1955 and No. 4177 of 1957 (Tokyo Dist. Ct., Civ. Affairs, 24th Dep't, 7 December 1963), reprinted in The Law of War: A Documentary History, at 1688 (L. Friedman ed. 1972).

257. See Bright, supra note 47, at 35-36.

least 68,000 and 38,000, respectively. 258 Some scholars, who argue that the bombings were illegal, have put the number of dead at as high as 340,000. 259

The opposite conclusion has been reached by legal scholars who have examined the question from a strategic, rather than a tactical, viewpoint. In this view, the war-ending role of the two atomic attacks and the saving of millions of American and Japanese lives, both military and civilian, which would probably have been lost if a conventional invasion of Japan had been necessary, made the military result proportionate to the civilian destruction and death caused at the tactical level. 260

There has also been a debate ever since the bombs were dropped as to whether the atomic bombings were militarily necessary to induce the Japanese government to surrender, or whether the bombs could have been dropped on more isolated targets. 261 The test of military necessity, however, must be applied to the factual situation as perceived by the decision-maker at the time, and not in light of subsequently

258. Bright, supra note 47, at 8. But see Aftermath, supra note 75, at 15-16 (giving much higher death tolls of 140,000 and 74,000 for Hiroshima and Nagasaki by the end of 1945). See supra, at 24, text and accompanying notes.

259. Meyrowitz, supra note 142, at 240 (includes those who died within five years).

260. See, e.g., McDougal & Feliciano, supra note 110, at 660 n.421.

261. Id.

discovered information. From that war-time perspective, the belief that atomic attacks were necessary to force the surrender of Japan seems presumptively reasonable.

E. Reprisal and Reciprocity

A final issue in assessing the legality of using nuclear weapons is the issue of reprisal. Reprisals are defined by Oppenheim-Lauterpacht as "...[occurring] when one belligerent retaliates upon another, by means of otherwise illegitimate acts of warfare, in order to compel him... to abandon illegitimate acts of warfare and to comply in future with the rules of legitimate warfare." 262

In order to be lawful, among other requirements, the principle criteria are that reprisals must be used only as a last resort after other sanctions have failed, or would be clearly futile under the circumstances, and be proportional to the original violation. 263 The problem with reprisals, of course, is that they have historically been used as an excuse for violations of humanitarian law, as in the World War II terror bombings of urban population centers. 264

As to nuclear weapons, it has been said by many that

262. 2 Oppenheim-Lauterpacht, supra note 103, at 561. See also, Bristol, supra note 134, at 397.

263. 1 Oppenheim-Lauterpacht, supra note 103, at 141-143; Bristol, supra note 134, at 411. See also AFP 110-31, supra note 111, para. 10-7c.

264. See, e.g., 2 Oppenheim-Lauterpacht, supra note 103, at 562; Kalshoven, supra note 108, at 107 passim. See also Spaight, supra note 241. Cf. Carnahan, supra note 140.

the threat of retaliation is the key deterrent to nuclear war. 265 Possession of nuclear weapons for deterrence has been called lawful even by those who argue that use would be illegal. 266 If deterrence fails, however, using even illegal weapons for reprisals has been considered to be a lawful retaliation under the traditional law of war. 267

Further, the threat of such clearly negative sanctions as retaliation and reprisals has been an effective deterrent to nuclear war thus far in the nuclear age. 268 Hopefully, however, a much more positive sanction, an appreciation of the common humanity of all persons, will inhibit states from ever initiating a war in which such horrifyingly destructive reprisals might be necessary. 269

265. See McDougal & Feliciano, supra note 110, at 668; Mallison, supra note 107, at 335; Reisman, supra note 143, at 341; Moore, supra note 73, at 266. See generally Almond, supra note 139.

266. See, e.g., Weston, supra note 143, at 589; SIPRI, supra note 103, at 50 (possession for deterrence being lawful due to the "demands of peace"); Berman, supra note 152, at 261 (Soviet view of legality allowing possession for deterrence).

267. See, e.g., Bristol, supra note 134, at 406. See also SIPRI, supra note 103, at 48-49 (noting that reprisals are not allowed against certain protected objects, including protected persons under the Geneva Conventions (G.C. I, art. 46; II, art. 47; III, art. 13; IV, art. 33) and, depending on one's view of the applicability of Protocol I to nuclear weapons, civilians, cultural objects, objects indispensable to the survival of the civilian population, the environment, and dangerous forces (Protocol I, arts. 46-49)).

268. See, e.g., Mallison, supra note 107, at 335.

269. Id. at 336.

The legal question which must be answered, however, is whether nuclear weapons may lawfully be used in reprisal. By definition, this presumes that the nuclear use would otherwise be unlawful for one of the reasons enumerated at length above, because one considers nuclear weapons to be unlawful or because of an unlawful use such as an indiscriminate attack on civilians or one which inflicts disproportional injury on civilians. It also presupposes a similar illegal prior use of nuclear weapons in order to meet the requirement that the reprisal be proportional to the preceding illegality. The logical example is a nuclear attack on a major city. Would it be lawful to use nuclear weapons against an enemy city in reprisal?

Some scholars argue that it would not be lawful. 270 They argue, primarily, that such a reprisal use would totally eliminate the protected status of non-combatant civilians, would constitute a "terror" attack which is clearly prohibited under international law, and, as the history of World War II proves, rather than leading to a reduction in illegal acts it would likely lead to an escalatory spiral of countervalue attacks. 271

Another argument cited to support the illegality of nuclear reprisals is based on Article 51(6) of Protocol I to

270. See, e.g., Falk, supra note 142, at 537; Meyrowtiz, supra note 142, at 243; Weston, supra note 143, at 584.

271. See, e.g., Weston, supra note 143, at 584-85.

the Geneva Conventions, which states: "Attacks against the civilian population or civilians by way of reprisals are prohibited." 272 These scholars contend that the understandings stated by the major nuclear powers that Protocol I does not apply to nuclear weapons are ineffective.

They present three principle reasons for arguing that Protocol I applies to nuclear weapons. 273 First, an understanding is unilateral and, unlike a formal reservation, it is not binding on states who fail to object to it. In the case of Protocol I, no state has objected to the understandings on nuclear weapons. 274 Second, as pointed out earlier, these scholars contend it such understanding are invalid as contrary to the principle purposes of the agreement. 275 Third, the wide support for Protocol I, evidenced in its signing by some sixty-four states including the U.S., Britain, and the USSR, shows that it constitutes an emerging customary norm, which cannot be limited by understandings or reservations. 276

If true, then the last legal justification for a countervalue attack, as a lawful reprisal, would fail.

272. Protocol I, supra note 193, art. 51, para. 6.

273. See, e.g., Weston, supra note 143, at 566-67; Meyrowitz, supra note 142, at 252-53 n.89.

274. Weston, supra note 143, at 566 n.97.

275. See supra, at 73, text and accompanying notes.

276. See supra, at 63, 66, text and accompanying notes.

Opponents of this view, however, maintain the legality of reprisals under international law, even with nuclear weapons. They argue, inter alia, that Protocol I is not a binding norm of customary law in regard to nuclear weapons, as was discussed above. 277 They also contend that the "[p]rohibition of reprisals would dilute if not eliminate [the] threat [of retaliation] and logically lead to increased violation of the law." 278 Further, some argue that reprisals are simply a manifestation of the larger principle of reciprocity underlying all of international law. In this view, a state's obligations to adhere to the law is limited by reciprocal adherence. 279

This latter point may be overstated, but in the face of wanton violations of humanitarian norms it may be that reprisal-in-kind is the only means of and hope for enforcement. 280 As Oppenheim-Lauterpacht, for example, note:

...actual reciprocity is an essential and just condition of the observance of the rules of war by the belligerents. No belligerent can be expected to abide by the rules of war and, subject to overriding conditions of humanity, to refrain from reprisals to an adversary who patently and deliberately violates these rules. 281

277. See supra, at 72-74, text and accompanying notes.

278. Bristol, supra note 134, at 425.

279. See Carnahan, supra note 140, at 52-53 (citing Kalshoven, Oppenheim, and Wheaton).

280. See, e.g., Bristol, supra note 134, at 428-29.

281. 2 Oppenheim-Lauterpacht, supra note 103, at 236.

Even some of those who consider nuclear weapons to be illegal weapons allow for their use in reprisal. 282 The reason often given by such scholars is:

History has shown that the prohibition of a weapon is often insufficient reason to abstain from its use, but that the fear of reprisals in kind may induce a belligerent to refrain from using it. This institution of the reprisal is one of the most horrible aspects of the laws of armed combat, but in time of war it provides for almost the only sanction on violations of the law. Since in wartime no authority can enforce the law, the only sanctions are horizontal sanctions taken by the opponent: reprisal. 283

Finally, proponents of the legality of nuclear weapons argue that well-meaning legal declarations of the illegality of nuclear weapons are, in fact, dangerous. As Moore has written, "To declare the use of nuclear weapons illegal against an ongoing nuclear attack would...increase the risk of such an attack, undermine deterrence and, in any event, be inherently incredible." 284 The same argument may be made in regard to nuclear reprisals-in-kind against cities.

In fact, some argue that retaliation-in-kind to an attack on population centers is not a reprisal in the legal sense at all, since its purpose is not to enforce international law, but that it is lawful in a much more basic way, as a case of pure self-defense and absolute necessity. 285

282. See, e.g., N. Singh, supra note 142, at 135, 218-23; G. Schwarzenberger, supra note 142, at 48.

283. SIPRI, supra note 103, at 47.

284. Moore, supra note 211, at 266.

285. See, e.g., Bristol, supra note 134, at 431.

SECTION VI

CONCLUSIONS

A. Conclusions on the Legality of Nuclear Weapons Use

The legality of nuclear weapons employment is not, obviously, a simple issue. Astute legal arguments are made by both proponents and opponents of the legality of nuclear weapons. The conclusions reached in the foregoing analysis have been, consequently, tentative and limited.

It seems accurate to say that the limited use of tactical or strategic nuclear arms would be legal under the rules of humanitarian law if the targets were military ones and the attack did not cause immediate or long-term civilian casualties which were disproportionate to the military advantage sought. This conclusion, however, contains many qualifiers, and it is not at all clear that any use of nuclear weapons could remain so limited.

If limited nuclear strikes were to result in escalations which, even if directed against military targets, resulted in millions of civilian deaths, then the legality of the use of nuclear weapons becomes highly questionable under the proportionality requirement of the international humanitarian law of coercion control. Further, some uses of these terrible weapons would be clearly illegal: in aggression, in non-reprisal terror attacks on cities, and when the resulting civilian destruction undoubtedly will be disproportionate to the military objective sought.

In this author's view, the possibility of escalation once the nuclear threshold is crossed is so great and the consequences are so dire, including the terrible possibility of triggering a nuclear winter, that the resort to nuclear weapons should be made only in the defense of ultimate national survival. Even then, use of nuclear arms probably should be limited to only to retaliations-in-kind. Lesser defenses of national interests should rely upon conventional weapons.

This author also concludes, despite a trend in the law to further protect innocent civilians, that reprisals are still lawful in the case of nuclear weapons as the ultimate sanction against prior illegalities. Again, however, reprisals with nuclear weapons should be taken only in the most desperate of situations necessitating reprisal-in-kind.

B. Recommendations as to Future Policy

Most observers of the present state of nuclear terror readily concede the necessity for arms control agreements in order to lessen the current threat to the human race. This will require both the reduction in the number of nuclear weapons to well below their present high levels, and, hopefully, a concomitant reduction and limitation on the size of allowable nuclear warheads. This would reduce the threat of nuclear annihilation, but not eliminate it.

Some analysts have also recommended that nuclear weapons be designed so as to more fully comply with the

humanitarian norms described above. For example, a study by the RAND Corporation concludes that the mutual assured destruction (MAD) strategy is "directly opposed to the most fundamental principles of international law governing armed conflict", and, consequently, nuclear strategies and weapons must emphasize discriminate, militarily effective weapons targeted on military targets and war-supporting activities. 286

This would mean the development of smaller warheads, "smart" weapons which can be precisely targeted, and reduced-radiation weapons. Research and development on such weapons is presently on-going. 287

While more "discriminate" nuclear weapons might comply more closely to humanitarian norms in theory, in practice it is hard to envision nuclear weapons of any size or type, no matter how precisely targeted, which would not involve massive civilian deaths if used in significant numbers, especially given the problem of escalation. Further, as Professor Falk notes, "war-fighting" nuclear weapons and strategies ultimately increase the threat of mass destruction because "[t]he net effect of such strategies is to

286. C. Builder & M. Graubard, *The International Law of Armed Conflict: Implications for the Concept of Assured Destruction*, at vii, 48 (1982) (RAND Publication Series R-2804-FF)(cited in Falk, supra note 142, at 525-26).

287. Lemonick, A Third Generation of Nukes, Time, May 25, 1987, at 36 (giving examples of new nuclear weapons under development, including nuclear bombs that can be shaped to direct the blast at specific targets and not at nearby structures, and small warheads only two-tenths of a percent the size of the Hiroshima atomic bomb, among others).

overcome inhibition on the first use of nuclear weapons in a conflict situation... [and] the nuclear/non-nuclear fire-break is eroded, if not cast aside." 288

Unfortunately, scholars as varied as Falk, Reisman, and Almond, have reached essentially similar conclusions, that "some minimalist variant of MAD provides, arguably, the best hope of avoiding any future use of nuclear weapons..." despite the irony that MAD would, if implemented, be in flagrant violation of basic humanitarian norms. 289

These same scholars, and others, also agree that the only way out of the present minimal world order, with its nuclear sanctions, is the development of a new world order in which such weapons are unnecessary. This solution will require entirely new social, economic, political, and personality systems for the international community. 290

Until such a new international system emerges, the humanitarian law must continue to develop in order to clarify the legal controls on and lawful uses of nuclear weapons. For now, it can be said that all humanitarians must fervently hope that even those arguably lawful employments of nuclear weapons presented above are never used.

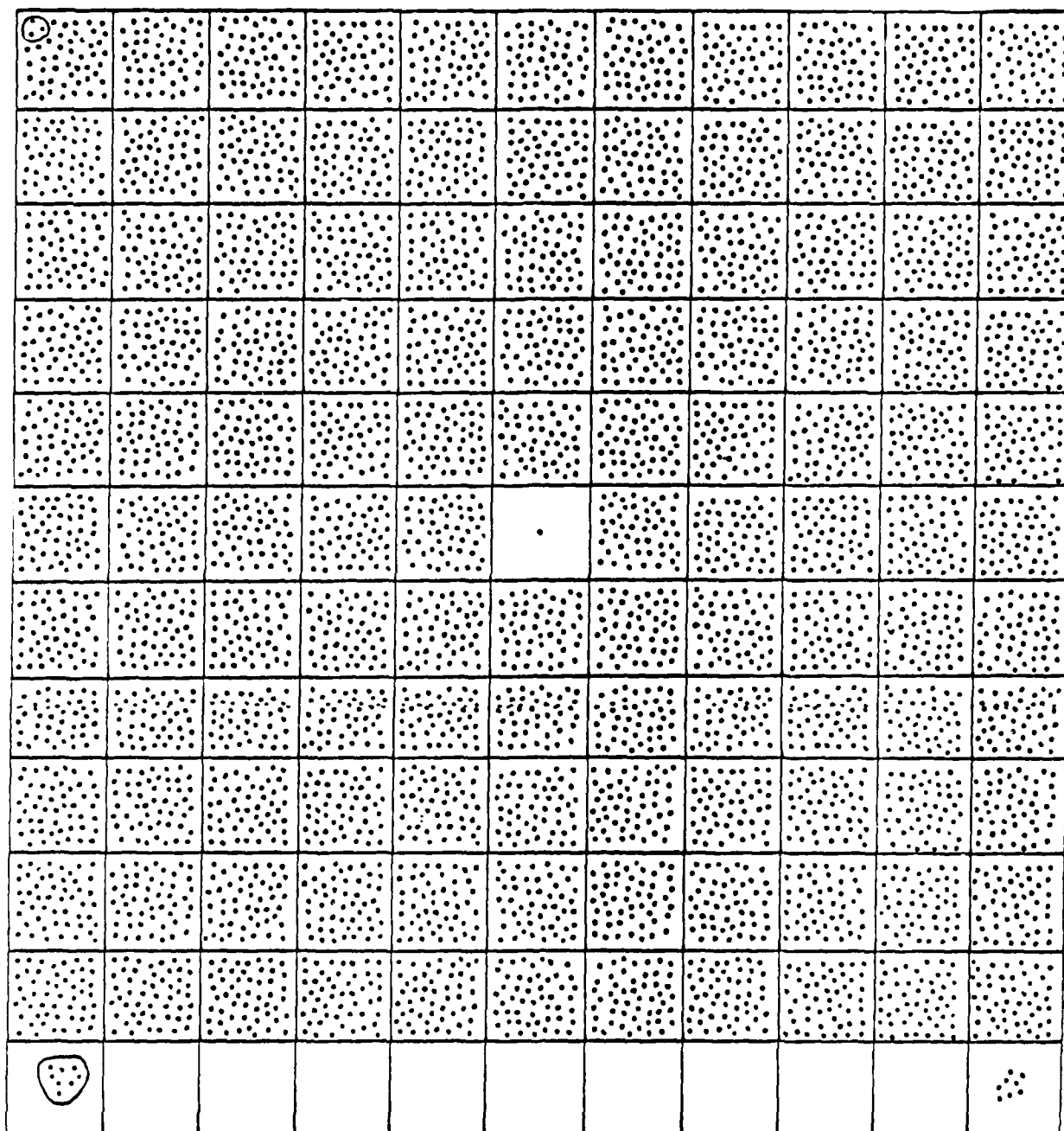
288. Falk, supra note 142, at 532.

289. Id. at 533. See also, Reisman, supra note 143, at 342-43; Almond, supra note 139; G. Schwarzenberger, supra note 142, at 61.

290. See Reisman, supra note 143, at 341-42; Falk, supra note 142, at 539; Almond, supra note 143, at 14.

APPENDIX A

Nuclear Weapons Chart



Nuclear Weapons Chart

The chart above shows the world's current firepower as opposed to the firepower of World War II. The dot in the center square represents all the firepower of World War II: 3 megatons. The other dots represent the world's present nuclear weaponry which equals 6,000 World War II's or 18,000 megatons. The United States and the Soviets share this firepower with approximately equal destructive capability.

The top left-hand circle enclosing 9 megatons represents the weapons on just one Poseidon submarine. This is equal to the firepower of three World

War II's and enough to destroy over 200 of the Soviets' largest cities. We have 31 such subs and 10 similar Polaris subs.

The circle in the lower left-hand square enclosing 24 megatons represents one new Trident sub with the firepower of eight World War II's. Enough to destroy every major city in the northern hemisphere.

The Soviets have similar levels of destructive power.

Just two squares on this chart (300 megatons) represent enough firepower to destroy all the large- and medium-size cities in the entire world. (U.S. Senate staff have reviewed this chart and found it to be an accurate representation of the nuclear weapons arsenal.)

Source: H. Willens, *The Trimtab Factor*, at frontispiece (1985).

APPENDIX B

Soviet-American Strategic Weapons

United States				Soviet Union			
System	Number deployed	Warheads/launcher ^a	Total warheads	System	Number deployed	Warheads/launcher ^a	Total warheads
ICBM				ICBM			
<i>Minuteman II</i>	450	1	450	SS-11	448	1	448
<i>Minuteman III</i>	550	3	1,650	SS-13	60	1	60
<i>Titan</i>	10	1	10	SS-17	150	4	600
				SS-18	308	10	3,080
				SS-19	360	6	2,160
				SS-25	72	1 ^b	72
Sub-total (ICBM):	1,010		2,110	Sub-total (ICBM):	1,398		6,420
SLBM				SLBM			
<i>Poseidon C-3</i>	256	14	3,584	SS-N-6	304	1	304
<i>Trident C-4</i>	384	8	3,072	SS-N-8	292	1	292
				SS-N-17	12	1	12
				SS-N-18	224	7	1,568
				SS-N-20	80	9 ^b	720
				SS-N-23	32	10 ^b	320
Sub-total (SLBM):	640		6,656	Sub-total (SLBM):	944		3,216
Sub-total (ICBM & SLBM):	1,650		8,766	Sub-total (ICBM & SLBM):	2,342		9,636
Bombers				Bombers			
B-52G/H (non-ALCM)	121	12	1,452	<i>Bear H (ALCM)</i>	40	20	800
B-52G/H (ALCM)	120	20	2,400	<i>Bear (non-ALCM)</i>	100	2	200
B-1	19	12	228	<i>Bison</i>	20	4	80
Sub-total (bombers):	260		4,080	Sub-total (bombers):	160		1,080
TOTAL	1,910		12,846	TOTAL:	2,502		10,716

^a Warheads per launcher are taken from SALT II Treaty, Article IV, Paragraph 10, First Agreed Statement and Common Understanding. The *Trident C-4* had been tested with only 7 re-entry vehicles at the time of the signing of SALT II in 1979, but it had space for an additional re-entry vehicle, which had been demonstrated earlier in a test. Under the Second Agreed Statement to paragraph 10 of Article IV, the missile would be counted as having 8 warheads. This is the number

currently assigned the missile in this Table and is taken from Table 1.

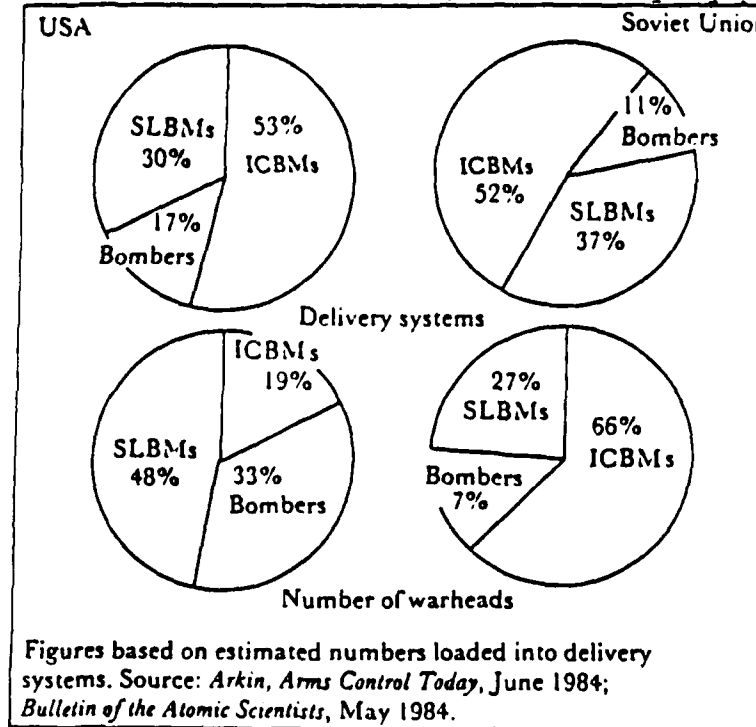
The number of ALCM assigned to each heavy bomber is 20 (SALT II Treaty, Article IV, paragraph 14, Second Agreed Statement).

^b For missiles deployed since the signing of the SALT II Treaty, the following warheads are assigned: SS-25, one; SS-N-20, nine; SS-N-23, ten.

Source: Int'l Inst. for Strategic Studies, *The Military Balance 1986-1987*, 222 (9186).

APPENDIX C

Soviet-American Strategic Delivery Systems



Source: J. Turner & Stockholm Int'l Peace Research Inst., *Arms in the '80's*, 33 (1985).

APPENDIX D

Chinese Nuclear Weapons

Delivery	Weapon system		Year deployed	Range (km)	Warheads x yield	No. in stockpile
	Type	No. deployed				
Aircraft ^a	B-4 (Bull)	30	1966	6 100	1-4 x bombs	30
	B-5 (Beagle)	10	1974	1 850	1 x 1 Mt	10
	B-6 (Badger)	100	1966	5 900	1-3 x 1 Mt	30
Land-based missiles	CSS-1 (DF-2)	40-60	1966	1 100	1 x 20 kt	40-60
	CSS-2 (DF-3)	85-125	1972	2 600	1 x 2-3 Mt	85-125
	CSS-3 (DF-4)	- 5	1978	7 000	1 x 1 Mt	10
	CSS-4 (DF-5)	- 5	1980	12 000	1 x 5-10 Mt	10
	DF-1 ^b	10-30	1966	650	1 x 2-10 kt	10-30
Submarine-based missiles	CSS-N-3	26	1983	3 300	1 x 200 kt-1 Mt	26

^a All figures for these bomber aircraft refer to nuclear-capable versions only. Hundreds of these aircraft are also deployed in non-nuclear versions.

^b A number of SRBMs (DF-1s) have been deployed in 'theatre support' roles, although they may no longer be active. Some of the MRBM and IRBM missiles are assigned to 'regional nuclear roles'. China has tested a number of warheads with yields from 2 to 20 kt

Total = 251-321

French Nuclear Weapons

Delivery system	Weapon system		Year deployed	Range (km) ^a	Warheads x yield	Warhead type	Number in stockpile
	Type	No. deployed					
Aircraft ^b	Mirage IVA ^b	34	1964	1 500	2 x 70 kt	AN-22	75
	Jaguar A	45	1973	1 400	1 x 6-8/30 kt	'	50
	Mirage IIIE	30	1964	1 200	1 x 6-8/30 kt	'	35
Air refuellers	C-135F	11	1965	—	—	—	—
Land-based missiles	S3	18	1980	3 500	1 x 1 Mt	TN-61	18
	Pluton	42	1974	120	1 x 15-25 kt	ANT-51	120
Submarine-based missiles	M-20	80	1977	3 000	1 x 1 Mt	TN-61	80
	M-4	16	1985	4 000	6 x 150 kt	TN-70	96
Carrier aircraft	Super Etendard	36	1978	650	1 x 6-8/30 kt	'	40

^a Range for aircraft indicates combat radius.

^b The AN-51 warhead is also possibly a secondary bomb for tactical aircraft, and the AN-52 is also possibly a secondary bomb for the Mirage IVA.

^c Warheads include ANT-51, ANT-52 and possibly a third type.

Total = 514

British Nuclear Weapons

Delivery system	Weapon system		Year deployed	Range (km) ^a	Warheads x yield	No. in stockpile
	Type	No. deployed				
Aircraft	Buccaneer 52 ^b	30	1962	1 700	2 x bombs	60
	Jaguar A ^b	36	1973	1 400	1 x bombs	36
	Tornado GR-1 ^c	140	1982	1 300	2 x bombs	280
Submarine-based missiles	Polaris A3	32	1968	4 600	3 x 200 kt	96
	Polaris A3-TK	32	1982	4 700	2 x 40 kt	64
Carrier aircraft	Sea Harrier	30	1980	450	1 x bombs	30
ASW helicopters	Sea King	69	1976	—	1 x depth bombs	69
	Wasp	16	1963	—	1 x depth bombs	16
	Lynx	35	1976	—	1 x depth bombs	35

^a Range for aircraft indicates combat radius.

^b Some Buccaneer and Jaguar aircraft withdrawn from bases in FR Germany may be assigned nuclear roles in the UK.

^c 220 Tornado attack aircraft (GR-1) are on order for the Royal Air Force and continue to replace Jaguar aircraft

Note: 34 Nimrod ASW aircraft, 12 Lance launchers and artillery guns also certified to use US nuclear weapons

Total = 686

Source: J. Turner & Stockholm Int'l Peace Research Inst.,
Arms in the '80's, 94 (1985).

APPENDIX E

U.S. Theater Nuclear Weapons

Delivery system	Weapon system		Year deployed	Range (km)	Warheads x yield	Warhead type	Number in stockpile
	Type	No. deployed					
Aircraft	"	2 000	—	1 060–2 400	1–3 x bombs	"	2 800
Land-based missiles	Pershing II	54	1983	1 790	1 x 0.3–80 kt	W-85	54
	GLCM	80	1983	2 500	1 x 0.2–150 kt	W-84	100
	Pershing Ia	144	1962	740	1 x 60–400 kt	W-50	280
	Lance	100	1972	125	1 x 1–100 kt	W-70	1 282
	Honest John	24	1954	38	1 x 1–20 kt	W-31	200
	Nike Hercules	200	1958	160	1 x 1–20 kt	W-31	500
Artillery ^b	"	4 300	1956	30	1 x 0.1–12 kt	"	2 422
Atomic demolition mines	Medium/special	610	1964	—	1 x 0.01–15 kt	W-45/54	610
<i>Naval systems</i>							
Carrier aircraft	"	900	—	350–1 800	1–2 x bombs	"	1 000
Land-attack SLCMs	Tomahawk	50	1984	2 500	1 x 5–150 kt	W-80	50
ASW systems	ASROC	n.a.	1961	10	1 x 5–10 kt	W-44	574
	SUBROC	n.a.	1963	60	1 x 5–10 kt	W-55	285
Ship-to-air missiles	P-3/S-3/SH-3	630	1964	2 500	1 x <20 kt	B-57	897
	Terrier	n.a.	1956	35	1 x 1 kt	W-45	100

^a Aircraft include Air Force F-4, F-16 and F-111, and NATO F-16, F-100, F-104 and Tornado. Bombs include four types with yields from 20 sub-kt to 1.45 Mt.

^b There are two types of nuclear artillery (155-mm and 203-mm) with three different warheads: a 0.1-kt W-48, 155-mm shell, a 1–12-kt W-33, 203-mm shell; and a 1-kt W-79, enhanced-radiation, 203-mm shell.

^c Aircraft include Navy A-6, A-7, F/A-18 and Marine Corps A-4, A-6 and AV-8B. Bombs include three types with yields from 20 kt to 1 Mt.

Source: J. Turner & Stockholm Int'l Peace Research Inst., Arms in the '80's, 90 (1985).

APPENDIX F

Soviet Theater Nuclear Weapons

Delivery system	Weapon system		Year deployed	Range (km)	Warheads x yield	Warhead type	Number in stockpile
	Type	No deployed					
Aircraft	^a	2 000	—	1 060–2 400	1–3 x bombs	^c	2 800
Land-based missiles	Pershing II	54	1983	1 790	1 x 0.3–80 kt	W-85	54
	GLCM	80	1983	2 500	1 x 0.2–150 kt	W-84	100
	Pershing Ia	144	1962	740	1 x 60–400 kt	W-50	280
	Lance	100	1972	125	1 x 1–100 kt	W-70	1 282
	Honest John	24	1954	38	1 x 1–20 kt	W-31	200
	Nike Hercules	200	1958	160	1 x 1–20 kt	W-31	500
Artillery ^b	^b	4 300	1956	30	1 x 0.1–12 kt	^b	2 422
Atomic demolition mines	Medium/special	610	1964	—	1 x 0.01–15 kt	W-45/54	610
<i>Naval systems</i>							
Carrier aircraft	^c	900	—	550–1 800	1–2 x bombs	^c	1 000
Land-attack SLCMs	Tomahawk	50	1984	2 500	1 x 5–150 kt	W-80	50
ASW systems	ASROC	n.a.	1961	10	1 x 3–10 kt	W-44	574
	SUBROC	n.a.	1963	60	1 x 5–10 kt	W-55	285
	P-3/S-3/SH-3	630	1964	2 500	1 x < 20 kt	B-57	897
Ship-to-air missiles	Terrier	n.a.	1956	35	1 x 1 kt	W-45	100

^a Aircraft include Air Force F-4, F-16 and F-111, and NATO F-16, F-100, F-104 and Tornado. Bombs include four types with yields from 20 sub-kt to 1.45 Mt.

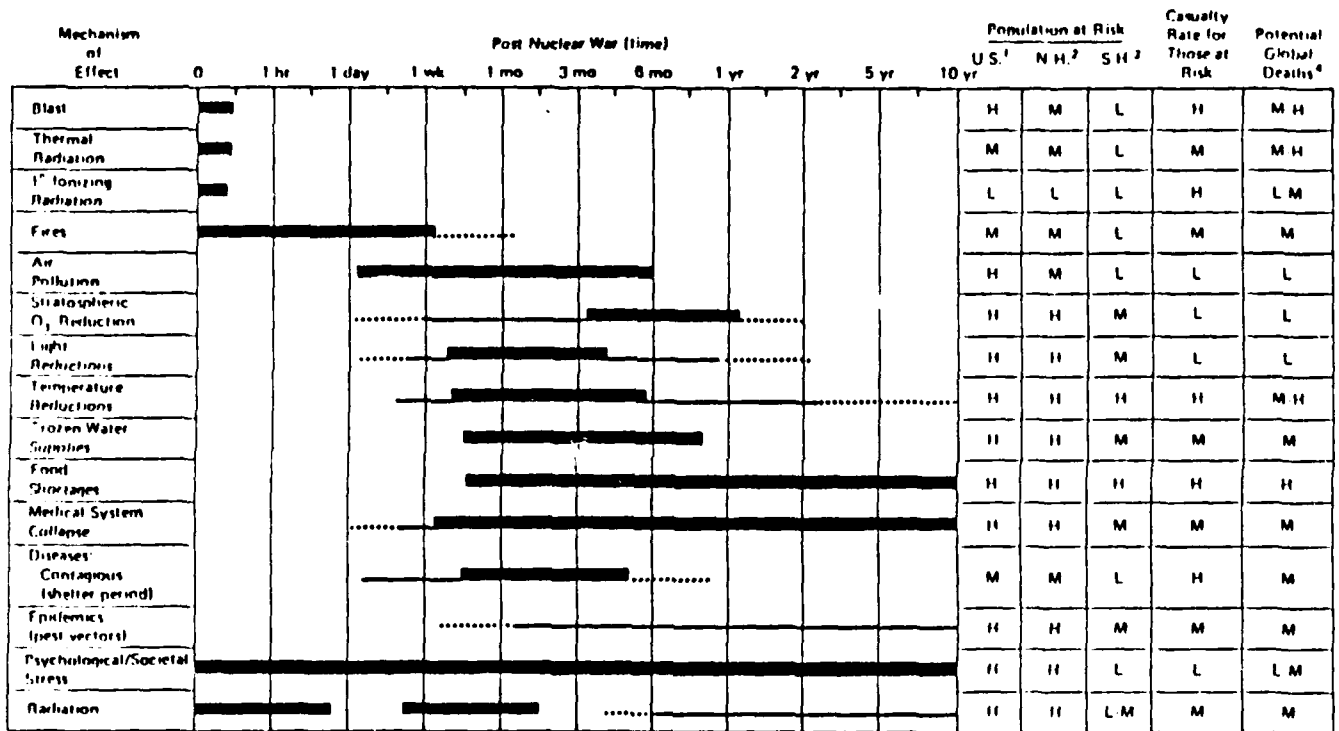
^b There are two types of nuclear artillery (155-mm and 203-mm) with three different warheads: a 0.1-kt W-48, 155-mm shell, a 1–12-kt W-33, 203-mm shell; and a 1-kt W-79, enhanced-radiation, 203-mm shell.

^c Aircraft include Navy A-6, A-7, F/A-18 and Marine Corps A-4, A-6 and AV-8B. Bombs include three types with yields from 20 kt to 1 Mt.

Source: J. Turner & Stockholm Int'l Peace Research Inst., Arms in the '80's, 91 (1985).

APPENDIX G

Effects of Large-scale Nuclear War



¹ U.S. United States ² N.H. Northern Hemisphere ³ S.H. Southern Hemisphere ⁴ Global deaths: L, 0-10⁶; M, 10⁶-10⁷; H, 10⁷

Source: M. Harwell, Nuclear Winter 154 (1984).

END

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